WESTERN GAS

The wisest piggie builds of bricks
He knows the wolf is up to tricks!
Hooray! His puffs don't stir a brick.
The little pigs feel pretty slick!
The wolf puts on a new disguise,
Oh will the little pigs get wise?
The Portland Gas & Coke Co.
WISHES YOU ALL A
Merry Xmas
and a
Happy New Year
THERE WILL BE NO BIG
BAD WOLF IN 1935

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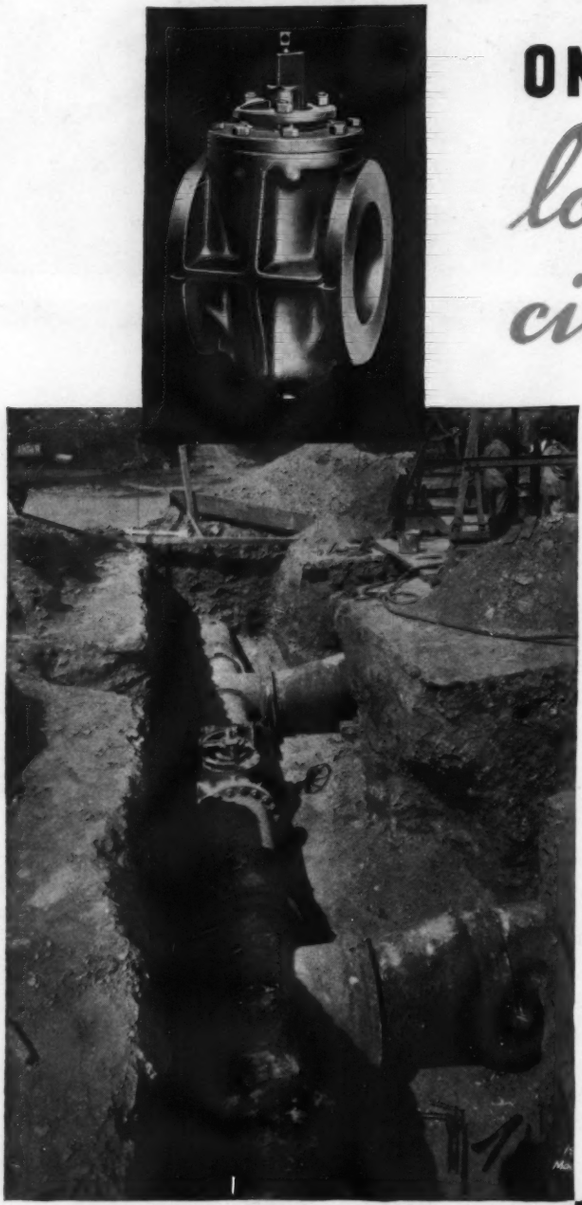
PERIODICAL DIVISION

ATTENTION-GETTER!

Pigs-Wolf combination with animated figures used in Portland Gas & Coke Company window for holiday season last year

December 1935 ◆ ◆ 25 Cents

USE NORDSTROMS ON *low-pressure city gas lines too!*



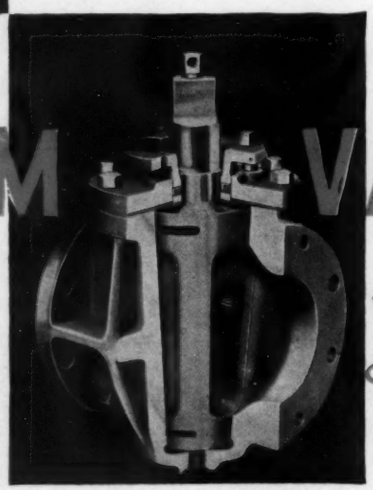
Standard Nordstrom Valve installed on low-pressure city gas main in a Pennsylvania town.

MANY progressive gas companies that have adopted Nordstrom Lubricated Valves for their high-pressure transmission lines are also installing them as replacements on *low-pressure* city distribution lines. It's a safe policy. After long inactive periods ordinary valves are apt to stick; corrosion set in, etc. In case of an emergency shut-off this might prove hazardous. NORDSTROMS are always easy to turn, in any emergency. For replacements, use Emco-Nordstroms. They have face-to-face dimensions the same as gate valves.

Consider These Nordstrom Advantages For Low-Pressure City Service . . .

Instant closure.	Lubricated Plug.
Positive shut-off.	"Sealdport" lubrication.
No stem to break.	Less head space needed.
No leaks or hazards.	Protected against corrosion.

Gate valve face-to-face dimensions.



NORDSTROM VALVES

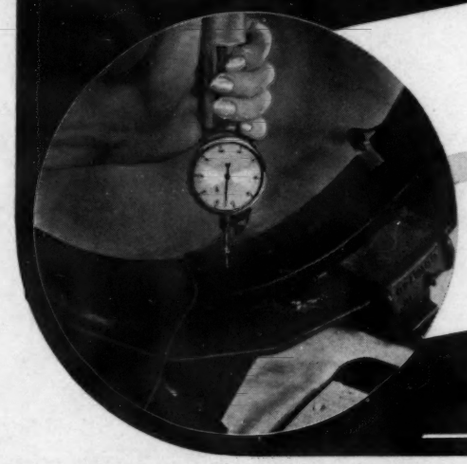
WITH PATENTED "*Sealdport*" LUBRICATION

ASK FOR BULLETIN

•

MERCO NORDSTROM VALVE CO.
A Subsidiary of
PITTSBURGH EQUITABLE METER CO.
Main Offices: Pittsburgh, Penna. *Branch Offices:* New York City, Buffalo, Philadelphia, Columbia, Memphis, Atlanta, Chicago, Kansas City, Tulsa, Houston, Los Angeles, Oakland.

The **DRESSER Sealometer**



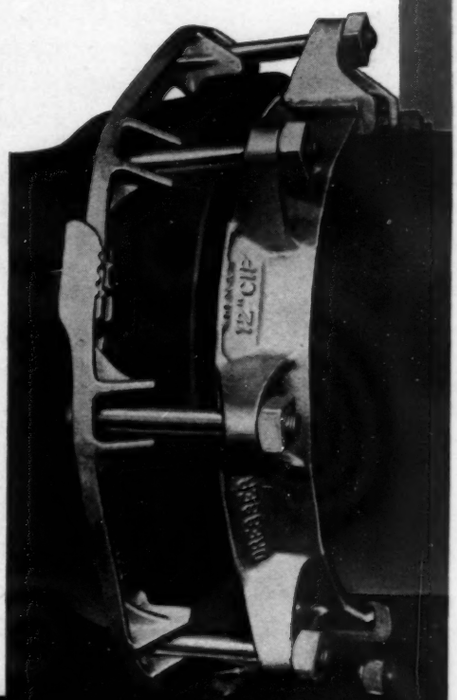
SEES ALL
TELLS ALL

—and insures high minimum gasket pressure on bell face and pipe spigot

Like invisible fingers prying their way into the hidden parts of a clamp . . . traveling around the bell face and then around the pipe spigot . . . searching out, with uncanny accuracy, the weak areas of low gasket pressure . . . revealing, too, the points of excessively high contact pressure—the Dresser Sealometer overlooks nothing, exposes everything, good or bad. Only a clamp that maintains high minimum gasket pressure can show a satisfactory curve on the Sealometer chart.

Without elaborate research on the part of Dresser Laboratories there would have been no precision instrument such as this for scientifically measuring the efficiency of clamp designs. Without the Dresser Sealometer, the Style 60 Clamp could not have offered the advantages it does.

The modern Dresser Bell Joint Clamp can be adjusted easily, installed in minimum time, and then forgotten—with the assurance that it will remain *absolutely,* permanently tight. Can you afford to use clamps without this assurance? *Send for Folder BJ-60.*



S. R. DRESSER MANUFACTURING CO. • BRADFORD, PA.

In Canada: Dresser Manufacturing Co., Limited, 32 Front Street, West, Toronto, Ontario

DRESSER BELL JOINT CLAMP *Style 60*

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WESTERN GAS

"Reg. U. S. Pat. Off."

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ABP

"LONG LIFE PIPE"

with gas-tight mechanical joints

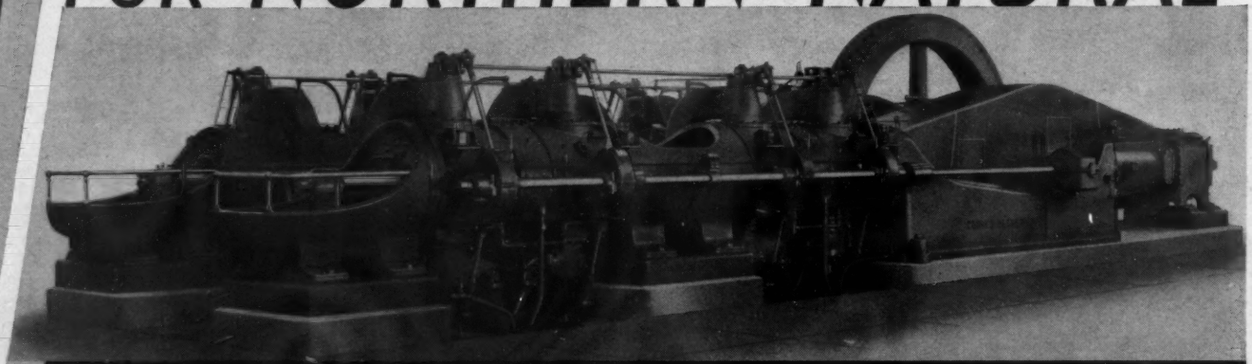
Two things are certain about cast iron bell-and-spigot pipe and the stuffing-box type mechanical joint—*long life and a bottle-tight joint.* History proves that cast iron is beyond comparison as a long-lived material for underground mains. Rigid tests conducted by the laboratory of the American Gas Association demonstrate that the stuffing-box type mechanical joint as made by our members is bottle-tight.

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago, Ill.

CAST IRON PIPE

METHODS OF EVALUATING BIDS NOW IN USE BY ENGINEERS RATE THE USEFUL LIFE OF CAST IRON PIPE AT 100 YEARS

THREE MORE UNITS FOR "NORTHERN NATURAL"



RATED 1300 H.P. EACH, FOR NEW MULLINVILLE STATION

THE officials of Northern Natural Gas Company did not have to "scratch their heads" when they decided on the power for their new Mullinville, Kansas, main-line compressor station. They simply ordered MORE COOPER-BESSEMERS! The main-line stations previously erected along this 1800-mile pipe line have been models of efficiency, economy, and dependability. Increasing activity in the natural-gas industry calls for the kind of compressors whose basic design has been proved by millions of hours on the load . . . the kind of units that are engineered right up to the minute, so as to be in tune with modern requirements . . . in short, Cooper-Bessemers! You know what you're getting when you get Cooper-Bessemers . . . there are so many successful installations!

THE COOPER-BESSEMER CORPORATION

Mount Vernon, Ohio — PLANTS — Grove City, Pennsylvania

25 West 43rd St., New York City
Mills Bldg., Washington, D. C.
640 East 61st St., Los Angeles, Calif.
Esperson Bldg., Houston, Texas
Magnolia Bldg., Dallas, Texas
225 Crockett St., Shreveport, La.
201 East First St., Tulsa, Oklahoma

MORE FOR OGDEN STATION, TOO

A 760 H. P. Type-19 compressor unit has been placed in Northern Natural Gas Company's main-line compressor station at Ogden, Iowa — alongside the two Cooper-Bessemer units installed a year ago. To supplement the existing 2-cylinder Type-14 generating plant, a 3-cylinder Type-14 vertical auxiliary has been installed, rated 135 H. P.

Uninterrupted Gas Consumption, because

"Kumfort" automatic storage gas water heater, made by Lovekin Water Heater Co., Philadelphia. Every rust-proof heater made by Lovekin has a welded Everdur tank.

RUST-FREE hot water, plus durability and economy! These are features that appeal to thoughtful homeowners. The same public that found rustable water pipe so *un*economical . . . and used rustless brass pipe instead . . . can be convinced of the better value offered by heaters with tanks of Everdur.

Nearly all copper . . . the traditional non-rust metal . . . Everdur is alloyed to provide the strength and welding properties of steel. Thus Everdur is considered *the ideal metal* for rust-proof tanks of welded construction. And leading heater makers offer their equipment with tanks of this strong, rustless metal . . . significant evidence of its widespread acceptance.

From your standpoint, Everdur tanks mean greater customer satisfaction, reduced servicing expense, and an uninterrupted use of fuel. Rust cannot interfere with their efficient operation. That is why we suggest that you encourage the use of Everdur-tanked equipment by your gas consumers. Additional information supplied on request.

ANACONDA
from mine to consumer
REG. U.S. PAT. OFF.

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
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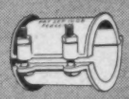
8870

EVERDUR METAL
"Everdur" is a registered trade-mark identifying products of The American Brass Company made from alloys of copper, silicon and other elements.

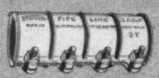
EVERDUR METAL *for* TANKS

RUSTLESS AS COPPER . . . STRONG AS STEEL

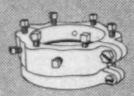
SKINNER



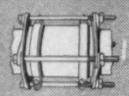
EMERGENCY PIPE CLAMP



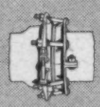
PIPE LINE CLAMP



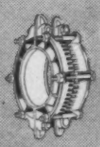
PIPE JOINT CLAMP



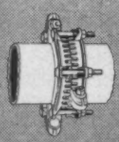
COLLAR LEAK CLAMP



BELL JOINT CLAMP



SPLIT COUPLING CLAMP



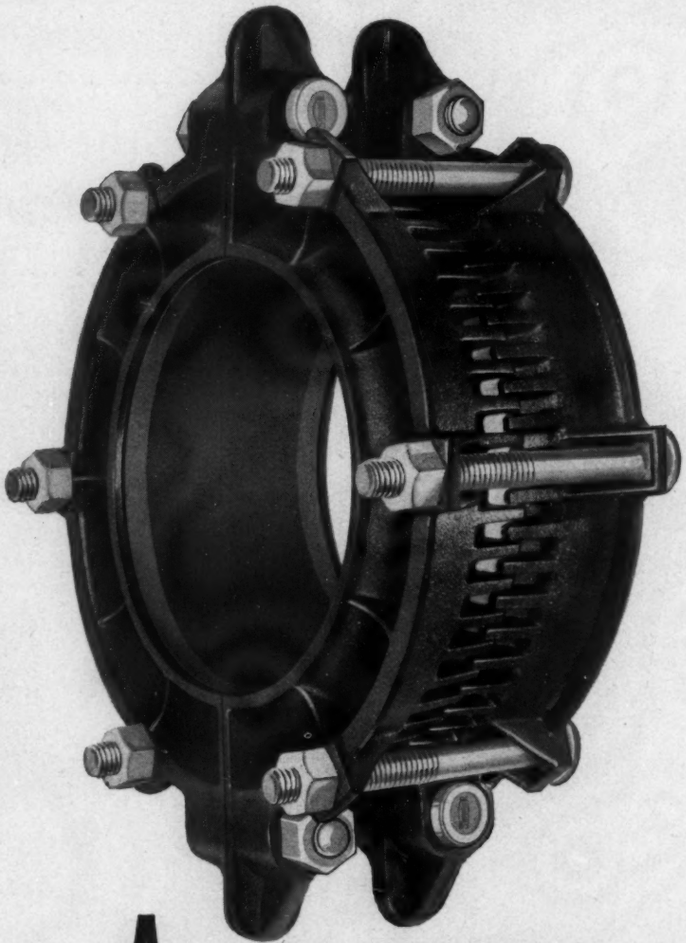
HIGH PRESSURE WELD CLAMP

SERVICE SADDLE

PRESSED STEEL ECONOMY CLAMP

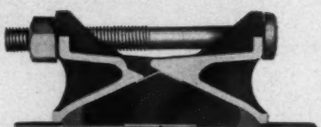
A CLAMP FOR EVERY LEAK

SKINNER SPLIT COUPLING CLAMP . . . ABSOLUTELY PERMANENT



A QUICK "ONE-MAN" REPAIR FOR CLEAN BREAKS IN CAST IRON PIPE!

★ Skinner Split Coupling Clamp can be applied by one man with ease . . . an absolutely permanent installation. Also used for leaks in cast iron brazed joints; for replacing leaky mechanical couplings. Made in sizes 2″ to 16″. Tested to 600 lbs. line pressure. Shipments made day orders are received!



Gasket is completely and permanently SEALED under tremendous pressure . . . as cadmium plated steel bolts are tightened and triangular gasket space reduced. Note Monel Metal Seal band at top . . . hard vulcanized sealing tips at sides of rubber gasket . . . intermeshing malleable iron rings.

M. B. SKINNER COMPANY

Manufacturers and Engineers • Est. 1898

SOUTH BEND • • INDIANA

WESTERN GAS
DECEMBER, 1935

Guest Editorial

FORGET TRADITION!

By W. W. WINTER

President, Atlanta Gas Light Company, Atlanta, Georgia

IF the gas industry were brand new today, instead of a century old, starting out to win a place for itself by sheer merit and in competition with all comers, without the benefit of tradition (and an honorable tradition it is), its position 10 years from now would probably be more firmly assured than it now actually is.

For under any possible handicap which might be imposed, under any competition which it might have to face, the service which it can offer to the public is so far superior to anything even approximating it that in even a reasonably fair fight, with sound and competitive business methods it could not fail to win for itself a dominant place in the life of this or any other country.

The legal rights of gas utilities have been established by a bitter and continuous fight for nearly a century. Without doubt they have been threatened almost continuously during that time, and never more seriously, perhaps, than today. I refer particularly to the right of a certain legal protection against competition which is our due in return for the regulation which is imposed upon us, and the right to maintain rates high enough to afford us a reasonable return upon our invested capital.

As far as rights are concerned, I would be the last to yield them. But as far as good business and the future of this industry are concerned, I believe this: With a very few special exceptions every gas utility in this country would be actually better off if it abandoned the idea of clinging desperately to artificial advantages—even though it may and does have the right to them—and plunged into the sea of open, unrestricted competition, to sink or swim on that basis.

For like it or not, we are coming into a new era as far as legal protection is concerned. Gas is a competitive business, and it is becoming more so. And the sooner we get our rates down on a competitive basis, whether it hurts or not, the sooner we clear out, write off and abandon any dead wood in our rate bases, strip for action, and then put out some *real* action, depending on nobody but ourselves, the sooner we will have earned by our own efforts the right to survive and to progress, on a basis that nobody can take away from us.

MODERN METHODS in industrial gas measurement

Base Pressure and Base Volume Indexes take mathematics out of customer relations . . . eliminating the need for chart calculations to determine billing data.

The modern installation of the Atlanta Gas Light Company illustrated gives the customer at all times a complete knowledge of fuel consumed.

These five 500B Ironcase Meters provide a capacity of 75,000 cubic feet an hour, and are the last word in safeguarding customer satisfaction with the use of gas fuel. Their one-piece body castings eliminate internal leakages; equipped with complete Alemite lubrication systems, and dust protection for the bearings, Ironcase Meters likewise insure a much longer period of accuracy and low cost operation.

These modern installations all over the world are adding to the value of industrial gas service.

If you do not have a copy of Bulletin EG40 it will be mailed you promptly on request.

334

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK, N. Y.

December, 1935

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. XI, No. 12

LOS ANGELES—810 South Spring Street . . . . . 1064 Peoples Gas Building—CHICAGO

Utility Act Moves Toward Test

SPECULATION was general, early in November, as to whether utility holding companies would register with the Securities and Exchange Commission by midnight of December 1, as called for in the Public Utility Act of 1935. Long before the month was out such speculation was laid to rest as major holding companies made known their nearly unanimous refusal to register.

United Gas Improvement Co.'s November 20 announcement that it would not register was the forerunner of a long list of similar decisions, all involving injunction proceedings against the S.E.C. to prevent enforcement of the Act's provisions. Among the larger holding companies which are committed against registering, in addition to U.G.I., are the American Water Works and Electric Co., Cities Service Co., Commonwealth and Southern Corp., Consolidated Gas Co. of New York, Electric Bond and Share Co., North American Co., Standard Gas and Electric Co., Stone and Webster, Inc., United Corp., and United Light and Power Co. Columbia Gas and Electric Corp. also did not register, a stockholders' suit standing in the way of such action.

In addition, above 300 companies have asked exemption from the Act's provisions, either as intrastate concerns or as companies involved in utility operations only incidentally. As suits began to multiply the S.E.C. on its own initiative issued a temporary blanket exemption from registering to all holding companies with operations confined primarily to a single state and also to those which are chiefly operating companies. These exemptions expire February 3 of next year.

The industry's practically solid front against registering reflects, of course, a well supported belief that proper court test will render the Utility Act invalid on constitutional flaws. Such a test already has been initiated by the Securities and Exchange Commission, which late in November called upon the Southern District Court in New York to compel the Electric Bond and Share Co. and five of its intermediate holding units to register as required by the Act.

A decision at Baltimore early in November in Federal Court condemned the Utility Act in most sweeping terms, referring to it as "grossly arbitrary, unreasonable, and capricious." In this ruling Federal District Judge William C. Coleman instructed the trustees of American States Public Service Co. to treat the Act as "invalid and of no effect." The Securities and Exchange Commission was not a party to the case above and was not bound by the decision, nor did the ruling extend to any other company. An appeal to the Supreme Court is anticipated, which of course would bring a binding and general ruling on the constitutionality issue.

Running somewhat counter to the opinion at Baltimore, a Chicago District Court ruling later in the month instructed trustees for the Public Utilities Securities Corp. to have the company register with the S.E.C., but to reserve full constitutional rights to hold the way open for possible future resistance to Commission actions.

At Wilmington, Del., another District Court met the constitutionality issue with a still different procedure, dismissing a trustees' petition for instructions with regard to registering under the Act. The judge in this Central West Public Service Co. proceeding refused to pass on the Act's constitutionality without giving the S.E.C. a hearing.

It is to be hoped that the E. B. and S. case or some other will find its way speedily to the Supreme Court, to clarify once and for all the status of the Utility Act.

While the above developments were starting the Utility Act through the legal labyrinth leading to an ultimate Supreme Court ruling, effects of the Act were manifest in other directions. The trend toward simplification of corporate structure gained momentum last month, as Electric Bond and Share and several other organizations took steps to dissolve interlocking relationships with subsidiary companies. In the case of E. B. and S. a new company known as Ebasco Services, Inc., has been formed to take over service contracts with operating utilities.

Underwrite National Advertising!

GAS utility managements last month were asked to make their individual decisions on a matter of tremendous importance—the proposed three-year national advertising and publicity campaign for the industry. On November 19 a letter went out to gas companies over the signatures of the A.G.A. Committee on National Advertising, requesting participation in the campaign and enclosing a form of pledge. Eight days later companies having 2,342,000 meters in service had already committed themselves to bearing a share of the cost on the stipulated basis of 4 cents per active meter. This is a fine showing, considering the limited time.

A fund of $500,000 annually, set up in the campaign proposed, can make a real impression—even in competition with the barrage of advertising and publicity being laid down by competing fuels. This force should be at work for gas service early in 1936, and it will be if the required 70 per cent of the industry's meters can be placed back of the campaign promptly.

To sum up the need for action now, we cannot do better than quote this paragraph from a letter relative to the campaign, received from Mr. Herman Russell, president of Rochester Gas and Electric Corp. and chairman of the A.G.A. Committee on National Advertising:

"This campaign must go over! The industry is facing a critical situation. It is no time to sit and twiddle our thumbs and watch the procession go by. Every gas company participating will for a relatively small contribution of its own, receive the benefit of the accumulated contributions of the entire industry. The national advertising will be a most important background and aid in each company's individual and local advertising. The public need to be told the truth—that gas is the best and most economical fuel to use in their homes, stores and factories. They must be sold and kept sold on this fact, so that they will not be deceived by the misleading and untruthful statements which are being broadcast throughout the land, over the air, and in the papers and periodicals, and by direct mail, by those competitors who are interested in the production and sale of other forms of fuel and energy."

ODORIZATION OF GAS

ODORIZATION, for the purpose of acting as a warning agent to prevent personal and property damage, or for the purpose of detecting gas leaks and so reducing unaccounted-for gas, is something that every distributor of natural gas is either practicing, experimenting with, or at least seriously considering.

Sense of Smell

This question of odor is a purely personal one. We are conscious of another man's blindness or deafness, but we are hardly ever conscious of his sense of smell. Psychologists, working with doctors, chemists and physicists, have been able to devise ways of measuring the accuracy of some of our senses. They can definitely measure the intensity of light, in candle power, and the wave length of light, and can tell how much variation in either is necessary before a given person under examination sees a change in intensity or in color. The same kind of measurement is possible with sound. The only measure that we have in the case of the sense of smell is in connection with quantity of material necessary to create a consciousness of difference in strength of odors. In the case of the sense of sight and the sense of hearing, qualitative differences in the form of color or in the form of musical notes can be distinguished rather accurately. The sense of smell is probably as accurate as any of our five senses in detecting quality differences but we have no way of measuring this ability.

So far as quantity differences are concerned, psychologists tell us that all five senses follow about the same law, stating that "intensity of sense reaction increases in arithmetical progression as the stimulus increases in geometrical progression."

Another thing that comes to light in examining the literature in regard to the sense of smell is that, without exception, the sense of smell becomes fatigued upon long association with any one odor. This fatigue apparently is concerned only with the odor in question, or odors very similar to it, but leaves the nose unimpaired for detection of dissimilar odorants.

Odor Desired in Gas

Since there are many materials that are fairly suitable from the standpoint of quality of odorant, there is always a discussion in regard to quantity of odorant to use. Two different materials may apparently have equal strength of odor when smelled from the container of odorant itself, or they may smell equally strong even when disseminated in the air of a room. There is apparently close agreement among all observers regarding concentration necessary for first perceptible odor or threshold concentration. Since we want to detect leaks of gas at low concentration of gas in air, it is probably this threshold concentration that is of more importance to us than strength of original pure odorant.

Monograph No. 4, covering work on odorants carried out at the Bureau of Mines, and supported by the American Gas Association, discusses the psychological phase of odorization and also discusses desirable concentrations of odor.

Everything from perfume to poison gases has been tried as an odorant in natural gas mains. One theory in regard to the type of odorant desired is that it should resemble the odor of manufactured gas. Manufactured gas odor is probably due to a mixture of things including olefines, sulphur compounds, aldehydes, coal tar hydrocarbons and phenolic compounds. The only reason for wanting to duplicate this odor is that it is publicly recognized as gas. It certainly is not a pleasant odor. Since this odor can be exactly reproduced only with difficulty, it is the consensus of opinion that a desirable odorant should (1) remind people of gas; (2) be non-toxic; (3) be non-injurious to gas equipment or home furnishings; (4) be insoluble in water; (5) be volatile; (6) be distinct and offensive within limits; (7) be strong enough in odor that only small quantities are required.

Most of these points need no elaboration. In regard to item (6), it has been concluded that an offensive odor more readily calls attention to itself than a pleasant odor does. An odorant for gas should not be so offensive as to be nauseating.

In regard to item (1), the characteristic odor of manufactured gas seems to be due more to the sulphur compounds it contains than to any other ingredients. The vapors of sulphur compounds of the class of aliphatic mercaptans and sulphides, when present in limited quantities in the air we breathe, are almost universally recognized as "gas" odor.

Monograph No. 4 concludes, after a study of over 50 materials, that ethyl mercaptan, a sulphur-containing body, was the most likely material to use as a gas odorant. This monograph shows technical comparisons with other mercaptans, such as amyl, but states that ethyl mercaptan is commercially available. Monograph No. 4 states, "for the mercaptans there is a general trend from the methyl compounds as least powerful, to the amyl compounds as most powerful, with the other substances in between; the others are probably in order of molecular weight, especially in high odor intensity." At the time that the work reported in Monograph No. 4 was under way, amyl mercaptan was not considered to be commercially available.

The subject of how much odorant to use is always open to discussion. In the case of Pentalarm we accepted the idea from the standpoint of safety that a factor of safety of eight was satisfactory. In other words, if the lower explosive limit of gas in air is 4 per cent, then for continuous odorization, concentration of odor in the gas should be such that when a concentration of ½ per cent gas in the air is reached, the odor is unmistakable to the average observer. Our original work with Pentalarm in actual odorization proved that when using 7/10 of a pound of Pentalarm per million cubic feet of sweet natural gas, ½ per cent of this gas in air was easily noticeable and the appearance of first odor was at a dilution of something less than ¼ of 1 per cent. Factors influencing this original conclusion will be discussed later on in this paper. At this concentration of 7/10 of a pound of Pentalarm per million cubic feet of gas, indoor leaks were readily apparent and some outdoor leaks were located by odor. When odorizing specifically for the purpose of locating outdoor underground leaks, there is apparently almost no limit to the amount of odorant that may be used. Condition of pipe line, condition of weather in respect to winds, and condition of the soil are all influencing factors. One method of procedure that seems very logical is that used at Lincoln, Neb., in which continuous odorization is carried on at a relatively low concentration, and then for about one day out of every month, odor concentration is increased. By this procedure, very noticeable increases in leak detec-

By M. M. WILSON
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Chicago, Illinois*

tion occur as odor increases. It might produce even better results to increase odor once every 60 days instead of every 30 days and continue this increased odorization for a period of several days instead of a period of one day. This procedure would allow a longer period for the location of any existing leaks before odor concentration again died down.

In connection with this question of quantity of odorant to use, and referring to the discussion of the psychological study of odorants, the only practical way to compare two odorants is under conditions of actual use in gas, and by determining the minimum quantity of this odorized gas that can be detected by odor. Since the human nose can not accurately differentiate between strengths of odor at high concentrations, and since the leaks that we want to locate will give only low concentration of odor, the comparative tests should be made as indicated. We care nothing about the comparative strengths of odor of 100 per cent gas but we are tremendously interested in whether or not concentrations of 4 per cent or less of gas in air can be easily detected.

Factors Influencing Odorization

The factors that have possible influence on odorization are humidity, temperature, line dirt, oil fogging, composition of gas, and soil condition.

After three years of careful observation of practical odorization, it has been concluded that humidifying gas has no detrimental effect on odorization.

This same period of observation indicates that temperature does affect odorization. When odorization is first started, some time is required before odor strength for a given feed of odorant reaches the maximum. If odorization is started up for the first time in cold weather, it has been found that, as warm weather approaches, amount of odorant required for a given odor concentration becomes less. This condition will exist for probably six weeks, after which the amount of odorant used is set back to normal. Then as cold weather again approaches, a slight excess of odorant is necessary for a few weeks, after which the procedure again settles back to normal. This fluctuation of odor with temperature is probably due to an amount of odorant absorbed or adsorbed on the walls of the pipe line and in the line dirt. These walls and this line dirt apparently hold more odorant in cold weather than they do in warm weather.

Excess quantities of line dirt have a detrimental effect on odorization because this line dirt, as mentioned in the discussion of temperature changes, will absorb odorant until it becomes saturated. If there is enough of this line dirt, it is easily possible for a mile of line to absorb enough odorant to normally odorize the gas passing through that line for six months.

No definite conclusion has been reached in regard to the effect of oil fogging on odorization. This is mainly due to the fact that practices are so dissimilar in various properties in regard to oil fogging. One of the requirements laid down for an odorant was that it should not be soluble in water. Most liquids that are insoluble in water are soluble in oil. It is reasonable to suppose that excess of oil fogging will wash

*Presented before the 15th Mid-West Gas School and Conference, conducted at Ames, Iowa, November 6-9, 1935, by Mid-West Gas Association and Engineering Extension Service of Iowa State College.

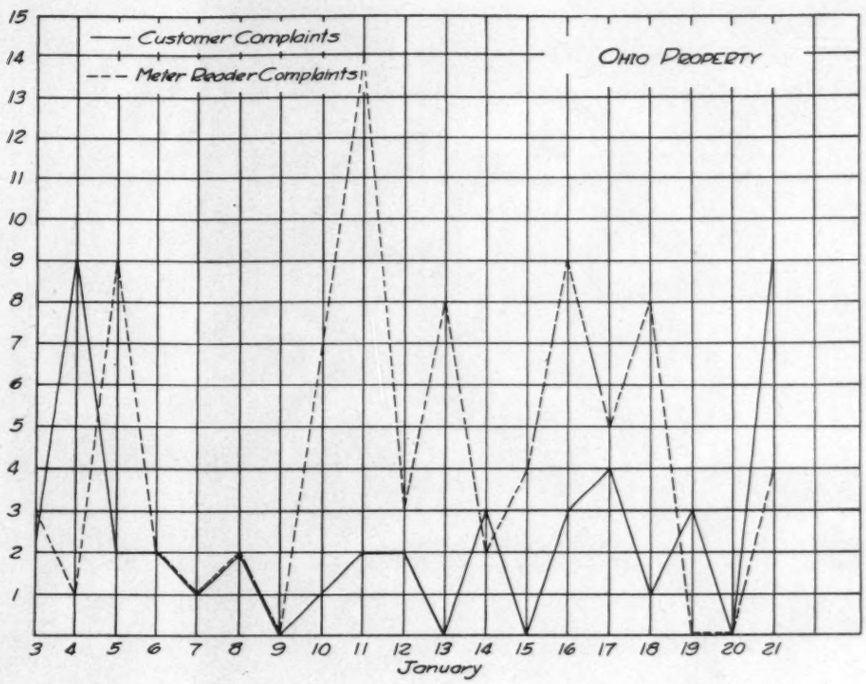


FIG. 1.

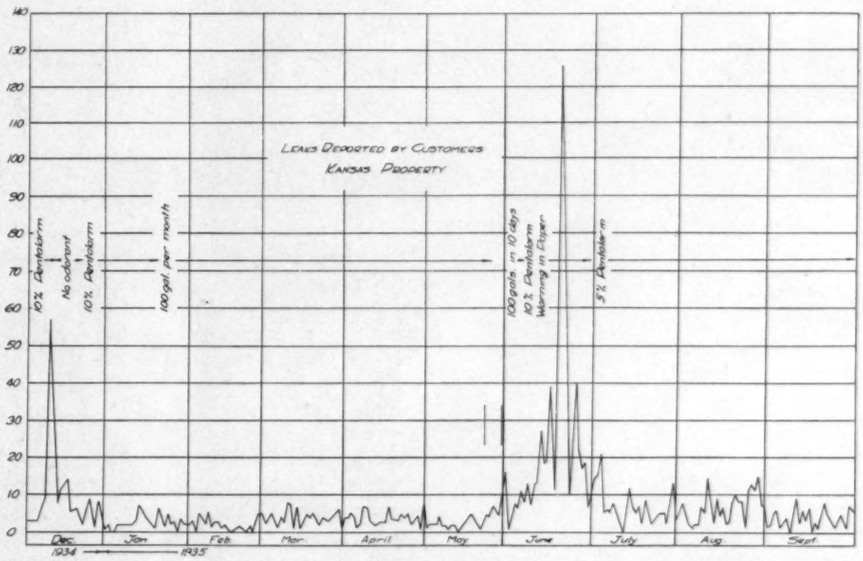


FIG. 2.

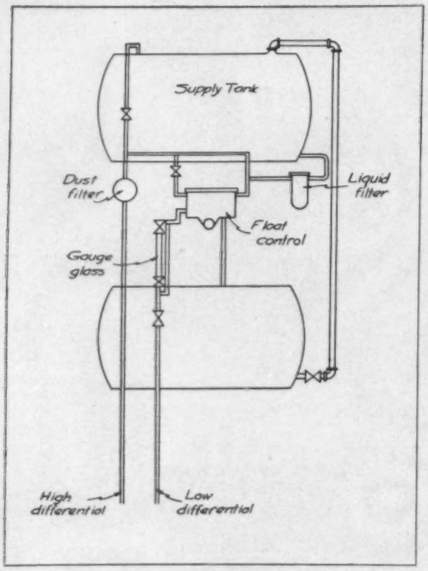


FIG. 3. Drip type odorizer.

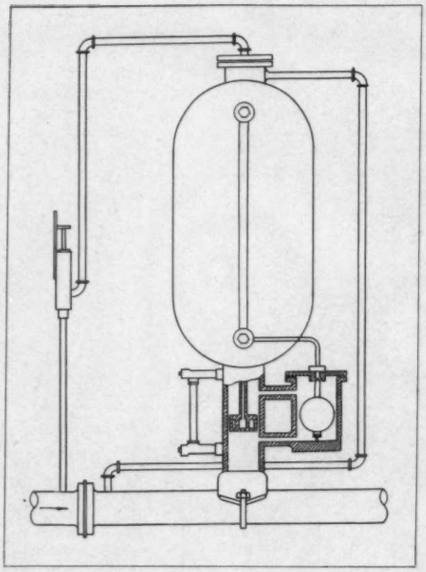


FIG. 4. Pentalarm by-pass odorizer.

odorant out of gas. There is some information to confirm this supposition, and a definite conclusion regarding this factor will probably be arrived at within the next six months.

At the present time everything from liquid fuels to straight water gas is being odorized successfully. Pentalarm is being used in liquid butane; it is being used by most of the major gas companies east of the Rocky Mountains in straight natural gas; Minneapolis is an example of its use in mixed gases; one of the largest industrial plants in the country furnishes an example of the use of Pentalarm in straight blue gas. Because of the poisonous nature of blue gas at low concentration, it is necessary, in order to keep the same factor of safety when odorizing blue gas, to use a correspondingly larger quantity of odorant.

The only thing that can be said about the effect of soil on odorization is that loose sandy soil permits the passage of gas and the odor more easily than heavy wet soil. Soil does have the property of absorbing odorant in the same way that absorption has been described in the case of line dirt. Wherever odorized gas has been escaping through the soil it will always be found that the soil itself carries a strong odor of gas. This odor in the soil will persist for some time after it has been exposed to fresh air. In general, the odor will follow wherever the gas goes, and since most lines are not buried very deeply, it will not take very long to saturate the ground directly above a leak so that the gas escaping above ground carries the odor with it. This is especially true if the odorant used is of a relatively volatile type.

Results of Odorization

The results to be discussed here were obtained with Pentalarm. Figs. 1 and 2 show graphically the results obtained in typical leakage studies in cities in the various parts of the country.

These curves are based on customer and meter reader complaints of house and line leaks in the properties in question before and after odorization. During the periods indicated in each of these figures a few underground leaks were located by odor. These underground leaks were of sufficient size to show a definite saving in unaccounted-for gas and were also of such a hazardous nature that definite danger was eliminated.

Most odorization at the present time is done at the town border stations, although many towns are being odorized in groups on lines as long as 100 miles. Gas has been successfully odorized at pressures from 8 ounces up to 150 pounds, and there is no theoretical reason why it could not be odorized successfully on up to the highest working pressure.

From experience to date, the only thing that should prevent bulk odorization in pipe lines is line dirt, and this is apparently only a matter of saturating the absorptive properties of such dirt.

Equipment

The two successful types of equipment used for metering odorants to gas mains are the drip type, by which liquids are admitted directly into the mains, and the absorption type, by which the odorant is placed in the main in vapor form.

Fig. 3 shows one form of drip type equipment. The best form of the drip type equipment operates across an orifice plate or other restriction in the line, and makes use of the differential created by this restriction, to force the odorizing liquid through a tiny orifice plate or needle valve in proportion to the differential. Odorization is not necessarily a precision matter, and if throughout the day the amount of odorant admitted to the gas varies even as much as 15 or 20 per cent on maximum and minimum sendout from the amount desired on the average sendout, results from such odorization will be entirely satisfactory. On small sendouts, using the drip type of odorizer, the flow of odorant is so slow through the tiny orifice plate or needle valve that unless special protection is provided the small opening may be clogged by the settling out of dirt and sediment, slowing down the feed of odorant.

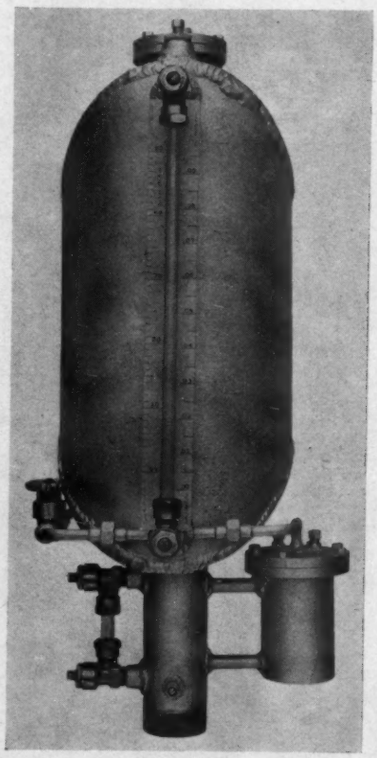


FIG. 5. View of Pentalarm odorization unit.

Figs. 4 and 5 show a by-pass absorption type equipment in which a proportioned amount of gas is by-passed through a precision valve around an orifice plate or other restriction in the line and saturated with odorant and then this gas is returned to the main gas stream. This type of equipment is to be desired on medium or small properties to the drip type of equipment. It can, of course, be adapted to sendouts of any size. While the absorption varies with

(Continued on Page 40)

Terms, Credits, and Collections as Aids in Industrial-Commercial Load-Building

By JOHN S. C. ROSS

Division Sales Manager, Pacific Gas and Electric Company, San Jose Division*

THE point of view held by the average salesman is that the credit and collection part of our business is a definite handicap to sales rather than an aid. It has been our experience, however, that the salesman who is constantly fighting the Credit Department is the one who does a poor all-round job for the company and that the best salesmen — those who consistently secure the greatest volume of desirable business—are those who go out into their territory not simply to get orders but to represent the company in every way. They are the salesmen who realize that their job is not done properly unless they have not only convinced their prospects of the superiority of the company's product and the advantage of using it in preference to something else, but have also made reasonably sure that if a sale is made the *company* will be able to collect its money and actually benefit by the securing of the new business.

JOHN S. C. ROSS

Such reasonable assurance can only be realized through close contact and cooperation with the Credit and Collection Department.

Successful salesmen are those (and it is no mere coincidence) who also follow up on the sale after it is made—after the equipment is installed—to see that the installation is working satisfactorily and that the customer is entirely satisfied. In so doing, they help the Collection Department to do its work and lead the way to additional sales.

Now, all this does not necessarily prove that credits and collections are *sales aids* but it does provide some pretty conclusive evidence that if proper thought and attention are given to Credits and Collections by the salesmen, a much better sales job is done.

For these reasons, we have required all our salesmen:

1. To be mindful of the customer's credit standing and ability to pay and in every possible way assist the Credit and Collection Department, and

2. To make a follow-up call after each sale or as many as may be necessary, to insure customer satisfaction and thus make it as easy as possible to secure satisfactory collections.

Collections, perhaps, are the most delicate relationship between the utility and the consumer. It is always advisable to inform the industrial salesman when difficulties have arisen in collections with one of the large customers that he personally sold for the company. The industrial salesman in question is more than likely on intimate terms with the consumer and has a sympathetic understanding of his problem. Judgment based on this knowledge is valuable to the collection department. It may save working an unnecessary hardship on the consumer and alienating his good will toward the utility. In these times, we cannot afford to jeopardize one dollar's worth of business, much of which has been obtained at the cost of considerable investment and sales expense on the part of the utility.

Terms

Terms, of course, are one of the greatest sales aids we have. Without an offer of terms on the equipment necessary to utilize our product, we would get very little of the potential business of today. Any terms offer made, however, should fulfill the following conditions:

1. The length of contract should be no longer than necessary to get the business.

2. The interest on deferred payments should be as low as possible. This is especially important, as business men, as a rule tend to shun contracts involving interest payments. In some cases it is desirable to eliminate all interest on deferred payments.

3. The down payment should be as low as possible (we find 10 per cent of the total cost of the job suitable) except in cases where credit standing may be somewhat doubtful, in which case the down payment should equal at least the cost of installation.

Trial and Test Installations

The use of trial installations with the entire possible financial loss as well as the burden of proof resting on the utility should be used judiciously, and rarely if ever in other than pioneering work.

When a large number of successful installations are in operation, one can view with skepticism the request for a trial and test proposal from a prospective buyer. Such an individual is apt to take advantage of the liberality of such an offer.

There are times, however, when the trial offer is the only way in which a skeptical prospect can be convinced. In case there are few similar installations available to furnish the necessary proof such an offer can be justified. Before extending a trial, however, we should proceed with caution; a careful analysis of operating conditions under the competing fuel should be made and the probable success of the trial installation must be carefully determined. Then, a very definite basis of acceptance should be set up and agreed to by the prospect in writing. Careful periodical follow-ups should be made and trial balances on cost struck off to make sure that the predicted performance is being secured. This follow-up is the responsibility of the salesman who sold the job and no commission should be paid until he has secured final acceptance.

Deferred Payments

The deferred payment plan is one which also should be used with caution.

*Submitted to the Pacific Coast Gas Association Annual Convention, September 17-19, 1935.

In "run of the mill jobs" there is little necessity or justification for it. It has its greatest usefulness in the sale of heating equipment in the summer. Without some special inducement, it is practically impossible to sell heating equipment in the summer. But the "load factor" on the sales department as well as the installation department may be greatly improved by deferring payments on heating installations made in the late spring and summer until say October 1st.

The deferred payment plan is also sometimes useful in cases of prospects of good credit standing who insist on the gas installation paying its own way. The following is an example of a gas conversion job which replaced oil in the boiler plant of a canning company. This prospect had a comparatively small plant and gas installation cost about $650. It was estimated that he could realize enough savings in two years to cover the cost of change-over to natural gas boiler fuel. The manager was adamant in refusing to entail any cost in plant improvements under existing economic conditions. To overcome this objection it was proposed to make the installation in September, 1934, with the first payment of 50 per cent of the cost due January 1, 1935, without interest, and the second payment due January 1, 1936, with the usual carrying charge added. The business, worth about $1,000 per year, was secured, and incidentally the first year's savings to the consumer wrote off the $650 cost of installation.

Long Terms

There are many cases when savings due to conversion to natural gas are very small or non-existent. In our territory, where we have been selling natural gas for over five years, most of the remaining industrial and commercial jobs of all types are either in that class or are jobs where the customer must pay a premium for gas. Under present economic conditions, it is extremely difficult to sell such jobs for cash or on a contract involving a large monthly payment. It has been necessary to extend terms up to 50 months without interest to secure some of this business. Needless to say, before extending such terms the prospect's credit is most carefully checked. We have had no reverts, to date, on such contracts, but none of them has yet run more than 24 months. We have no reason, at the present time, however, to expect any such reverts, as all those who purchased on that basis seem well satisfied.

In the case of commercial cooking we have used 36-month terms without interest as a means of securing business from selected credit risks in this classification.

We believe that this is the best inducement we have to offer for immediate sale of any new equipment replacing competing fuels. This enables us to sell the finest equipment obtainable to a customer and compete with cheap, unsatisfactory appliances without placing any strain on the customer's budget or finances. Those long terms necessarily must be without interest or they lose their attractiveness. As a public utility, with the sale of gas as our main objective rather than any profit on the merchandise, we should be able to offer this type of terms without carrying charge. In a great many cases where we replace French type ranges with modern unit type gas ranges the saving realized in fuel costs and repair bills actually will pay for the new equipment when sold on a basis of three years without interest. This is a powerful sales ally when attempting to replace oil or coal ranges which may be operating satisfactorily and the customer hesitates to spend any money but can see the desirability of gas as a fuel.

NEXT MONTH

The "Detroit Plan"

Detroit City Gas Co. is sharing profits with its customers. The rate and earnings plan applied in this major center will be described in *Western Gas* for January by one of the plan's principal authors.

Cellophane for Protecting Regulator Diaphragms

The October issue told of Cellophane for pipe line protection. Now it's regulator diaphragms, and an engineer who has used Cellophane successfully in this application for the past two years gives his experience next month.

Heat Accounting with Power Plant Instruments

Every B.t.u. must give an account of itself in modern steam electric generating plants. The system employed in a natural-gas-fueled steam plant—one of the country's largest—will be described in the January issue.

Making a New Natural Gas Community Heat Conscious

Summer sale of house heating, a different sort of advertising approach, and a well-designed dealer cooperative plan, put a western center on a 100 per cent gas basis very shortly after natural gas replaced manufactured. This article will review the methods used.

Basis for Credit

We cannot see that there should be any distinction made in extending credit for the commodity gas, on one hand, and on the equipment on the other. Credit should only be extended where the prospective customer has the necessary inclination and ability to pay his credit obligations and if he measures up to these requirements, credit should be extended as the circumstances of the case warrant.

Our practice on new commercial and industrial jobs is to secure a financial statement from which we check back references given and we also check the individual responsibility of the officers of the corporation or partnership as the case may be. Frequently, we secure the gas bill or the appliance bill by securing the signatures of the officers of the corporation as individuals as well as having the corporation officer or officers sign our agreements officially.

Lease or Rental Agreements

The installation of gas-burning equipment on a rental basis is attractive if the rental charge is two-part, one part covering amortization of the investment and one part interest charges. This set-up allows the renter to eventually own the equipment.

Care must be taken not to tie up too much of the utility's capital in a job in relation to the revenue to be derived from the new consumer. The maximum limit on service contracts is usually three years. If there is any danger of the rental agreement terminating in three years the utility may suffer a loss on the installation, as the rental agreement is usually amortized on about a 100-month basis of 1 per cent. To justify such a lease, the three-year revenue must be great enough to hazard a loss in equipment should the business terminate at the end of the service contract.

In the San Jose Division of the P. G. and E., lease contracts on a 1 per cent per month amortization basis with 6 per cent interest charge for a three-year term have been successful in getting several large surplus natural gas consumers on our lines.

Repossession and Resale

Industrial gas jobs have the uncanny faculty of usually costing about 50 per cent for installation and the balance for equipment.

It may truthfully be said that the salvage of the materials used in installations amounts to little more than the cost of removal. In plain English, it usually does not entail any more loss to leave the pipe fittings, etc., in and take

(Continued on Page 58)

UNDERGROUND GAS STORAGE

Experience of Louisville Gas & Electric Reviewed

By J. A. YUNKER

Superintendent Natural Gas Department
Louisville Gas & Electric Company

FOR the past three years the Louisville Gas and Electric Co. has been conducting an experiment in the underground storage of gas that, because of certain features of the storage reservoir, may have furnished the answer to questions concerning this method of gas conservation and use which heretofore have been the subject of much conjecture.

By way of background, natural gas was first brought to Louisville in 1889 from a relatively shallow shale field located 35 miles west of the city in Meade County. Although increased use of gas in Louisville in a very few years rendered this supply insufficient for the demand so that in 1913 a much larger line was laid in the opposite direction (200 miles to Eastern Kentucky and West Virginia), the Meade County field continued to deliver some gas until 1928. By that time it became necessary to find new supplies or abandon the line.

A geologic reconnaisance located a small structure within reach of the line and a well drilled high up on the dome struck gas in the Corniferous sand at about 650 feet. Subsequent drilling showed a small gas-bearing area covering about 350 acres, that later proved to contain approximately 600 million cubic feet of gas, an amount which would hardly pay for the expense incident to its production, transportation and marketing, especially since the gas contained hydrogen sulphide.

However, the contour data obtainable on the surface reinforced by that secured by drilling showed the structure to be a symmetrical flat-topped dome with the sides sloping away in all directions at a rate of nearly 10 in 100 feet and apparently completely surrounded by salt water. It was reasoned that these conditions made for an ideal small underground storage reservoir. The location of the area with respect to the pipe line together with the load factor and existing supply made such a storage proposition fit very nicely into the economic picture. With this use of the field in mind, pipe line connections were made and a compressor station designed to take gas from or put it into the reservoir was installed.

The rock pressure of the field at the time the first well was drilled showed as 125 pounds gauge but by the time large scale deliveries were begun this had dropped to 115 pounds due to gas lost and used in drilling, testing, etc. The extent of the reservoir was fairly well determined since the well which left the shale at 179 feet (above sea level) was a gas well while the one at 172 feet came in as a gasser but went to salt water in two days while being tubed. The area within the 180 contour line shown on the map (Fig. 1) is 352 acres.

Deliveries from the field began in April, 1930, at the rate of from ¾ to 1 million cubic feet per day. During the winter the rate was stepped up to as high as 2.5 million cubic feet per day. By January, 1931, some 290 million cubic feet had been taken out and the rock pressure had declined to 78 pounds.

At various times during this period gas was taken from all the wells except the one at the 179 contour, which happened to be in litigation. Weekly rock pressure tests were made and it was noted that the variation between the rock pressure of the different wells never exceeded 2 pounds regardless of whether or not the wells had been on the line just prior to the test.

When the rock pressure of the field reached 80 pounds, there was a sharp decrease in the pressure shown in the 200 contour well and a day later this well began to show water. A check-up showed that the 179 contour well, which had not been on the line, was flooded out. At 79 pounds the 205 contour well began making water and at 78 pounds the 214 contour well did likewise. By that time the three wells lowest on the structure (179, 200 and 206 contours) were completely flooded out.

The area within the 210-foot contour on the map includes 257 acres so that when the rock pressure reached 78 pounds, at lease 30 per cent of the original gas-containing sand had apparently been occupied by the encroaching salt water. During the next four months some 25 million cubic feet of gas was taken from the field and the pressure dropped an additional 2 pounds.

At this point in the test, the movement of the encroaching water offered material for some interesting speculations.

The fact that the water drive had started early in the withdrawal period is shown by the figures in Table No. 1.

TABLE NO. 1.

Accumulated Total of Gas Taken Out of Reservoir (MM Cu. Ft.)	Accumulated Drop in Rock Pressure (Pounds)	Average Million Cubic Feet Out, per Pound Drop in Rock Pressure
97	21	4.6
166	29	5.7
245	38	6.5

The effect of the water encroachment is still further borne out by the results of the next four-month period during which time of very slow withdrawal rate it took 12 million cubic feet to give 1 pound drop in rock pressure. However, at no time during the four years' experiment was there any increase in rock pressure while the wells were shut in.

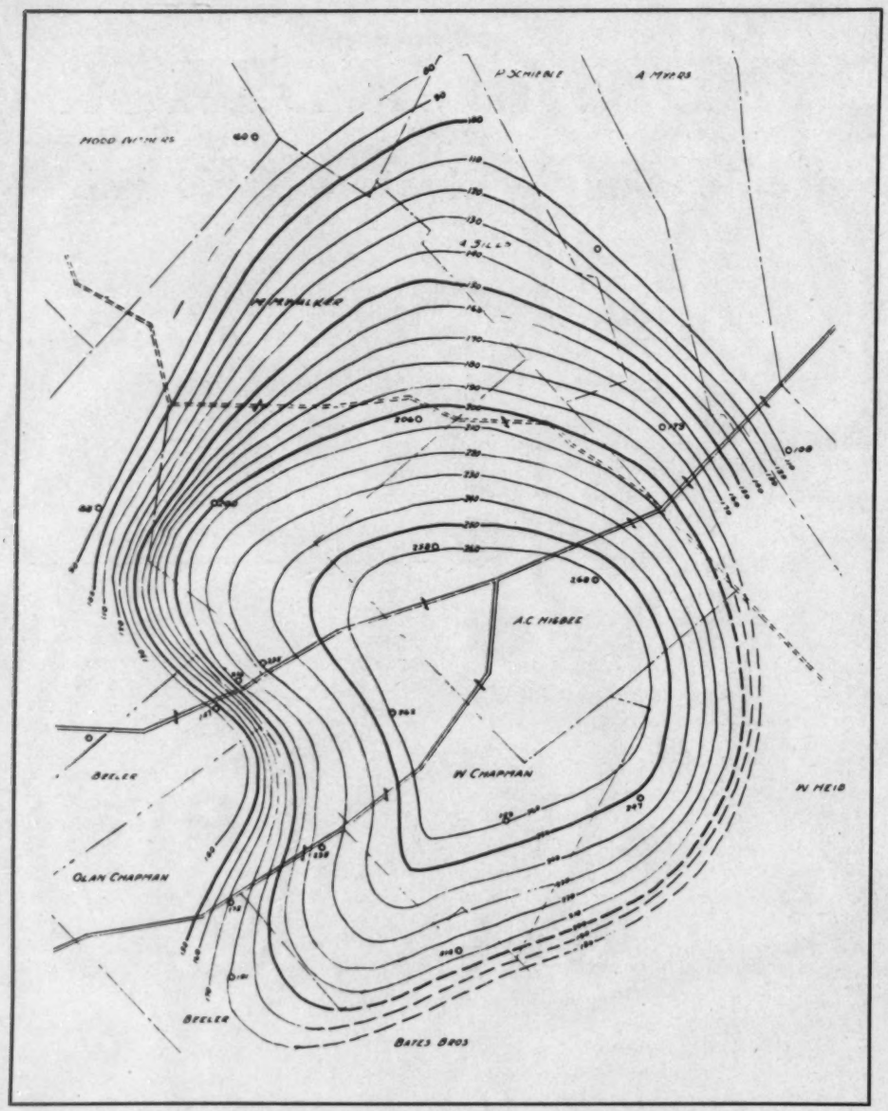
During the period May, 1931, to August, 1931, 140 million cubic feet of gas was put into the reservoir. In order to assure a uniform pressure against the surrounding water, gas was introduced through the three highest wells. Pressure changes during this period were as shown in Table No. 2.

TABLE NO. 2.

Accumulated Total of Gas Put in Reservoir (MM Cu. Ft.)	Accumulated Increase in Rock Pressure (Pounds)	Average Millions In, per Pound Increase in Rock Pressure
46	11.4	4.1
87	16.5	5.3
134	23.8	5.6
140	22.5	6.2

During the last part of this storage period the movement of the water apparently opened a passage for the gas into an area of sand previously sealed off by the way the water had run up the slope. When this occurred there was a drop of 1.3 pounds in rock pressure while 6 million cubic feet of gas was being stored.

It is interesting to note that the figure of 6.2 million cubic feet in, per



AT LEFT:

Contour map of Muldraugh Gas Field, where Louisville Gas & Electric Co.'s storage project has been under way for the past three years. Contour interval, 10 feet. Key horizon, bottom of shale. (Map revised April, 1935.)

pound increase in rock pressure, is very close to the 6.5 million out, per pound drop in rock pressure, although only 60 per cent of the gas taken out was replaced.

When the rock pressure reached 82 pounds the water line apparently passed below the 206-foot contour as the well at this level began to make gas again and in a couple of days showed no sign of its former flooded condition. The 200 contour well showed gas when the field pressure reached 95 pounds and at 97 pounds it, too, quit making water. The 179 level well was still flooded completely out when the filling of the reservoir was discontinued.

During the period December, 1931, to March, 1932, gas was again taken from the field. This time also all gas taken was from the highest three wells in an effort to keep from setting up low pressure areas adjacent to the surrounding water which might cause accelerated local movement of the liquid to surround bodies of gas. Pressure changes are shown in Table No. 3.

This time at 84 pounds the 200-foot level well flooded out. The 206-foot well flooded at 82 pounds. These wells flooded out at 80 and 78 pounds respectively during the first withdrawal. Note that it apparently took pressure of 97 and 83 pounds to push the water beyond these wells when the reservoir was being filled.

TABLE NO. 3.

Accumulated Total of Gas Taken Out (MM Cu. Ft.)	Accumulated Rock Pressure Increase (Pounds)	Millions of Gas Out per Pound Drop in Rock Pressure
15	2.7	5.7
69	15.0	4.6
118	27.4	4.3

TABLE NO. 4.

Accumulated Total of Gas Put In (MM Cu. Ft.)	Accumulated Rock Pressure Increase (Pounds)	Millions In per Pound Increase in Rock Pressure
16	7.0	2.3
52	16.5	3.1
96	24.5	3.9
141	30.4	4.6
184	39.0	4.8
226	39.5	5.7
266	43.5	6.1
276	42.7	6.5

Beginning in April, 1932, the second refilling of the reservoir began. In this test the gas was put in at an almost uniform rate of 1.4 million cubic feet per day over a period of seven months. The pressure at the beginning of the refilling was 70.6 pounds which was 6.6 pounds lower than the pressure to which the reservoir was emptied the first time. Pressure changes were as shown in Table No. 4.

This time the two wells which had flooded at 82 and 84 pounds, began to make very small quantities of gas at 84 and 95 pounds respectively. However, they seemed to have become salted up or waterlogged to such an extent that they have never become active wells since their second flooding.

At this point we have a reservoir from which sufficient gas was taken to drop its rock pressure from 125 to 77 pounds and to flood some 30 per cent of its sand. Then it had approximately 50 per cent of the gas taken out, replaced, and again withdrawn, after which the reservoir was refilled to practically its original rock pressure. During this period 421 million cubic feet of gas was metered out of the reservoir and 416 million cubic feet metered into it. The rock pressure of the field was approximately 7 pounds lower than when the experiment was started, but the gas apparently missing (estimated at 50 million) was easily accounted for by gas lost in drilling a deep test well, use by lessors, leakage, etc.

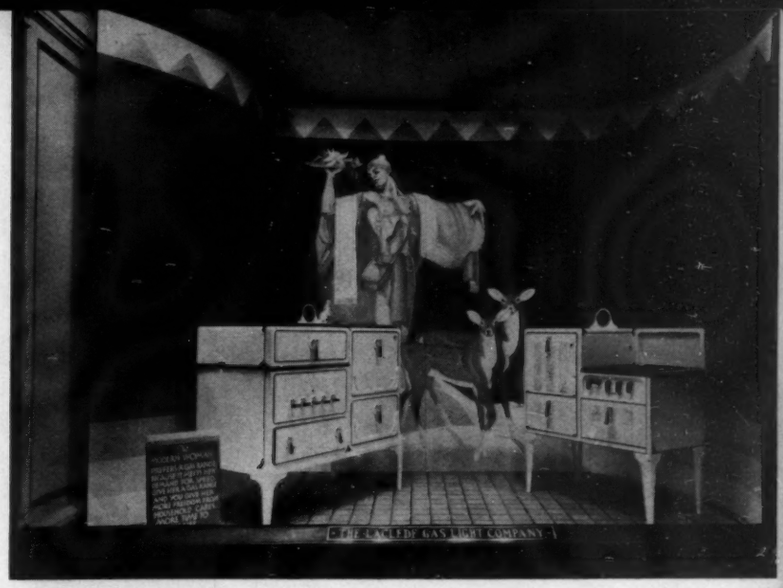
With the following data before us we venture to depart from the factual to indulge in a little theorizing.

The original rock pressure of the field was normal, in that it figured just about 40 pounds per 100 feet difference between the sea level elevation of the producing sand at the field and its nearest outcrop. The Corniferous sand had been drilled at enough

(Continued on Page 54)

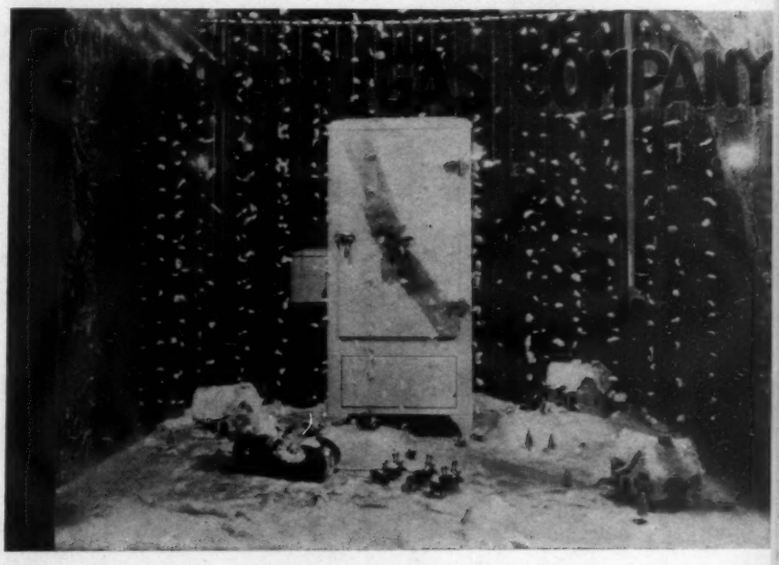
HOLIDAY DISPLAY

ON THIS page are several distinctive displays which carried the story of modern gas service to holiday shoppers in the 1934 pre-Christmas season. Attention is also called to the front cover of this issue, on which is reproduced the Portland Gas & Coke Co.'s 1934 "Three Little Pigs and the Big Bad Wolf" holiday window—one of the best bids to popular interest that has ever come to WESTERN GAS' notice.

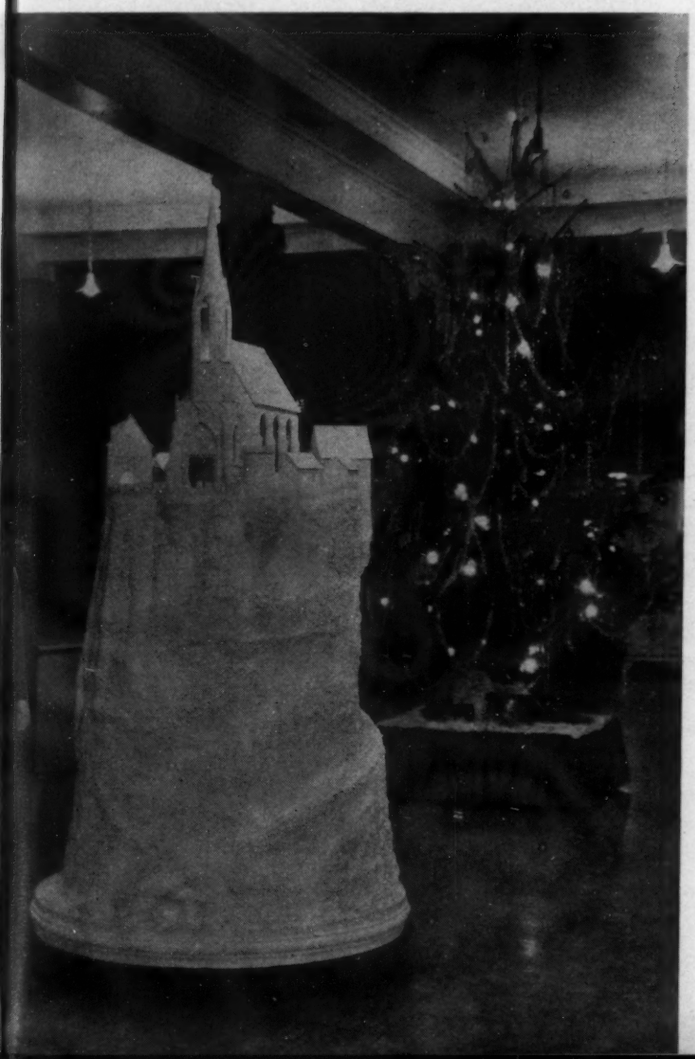


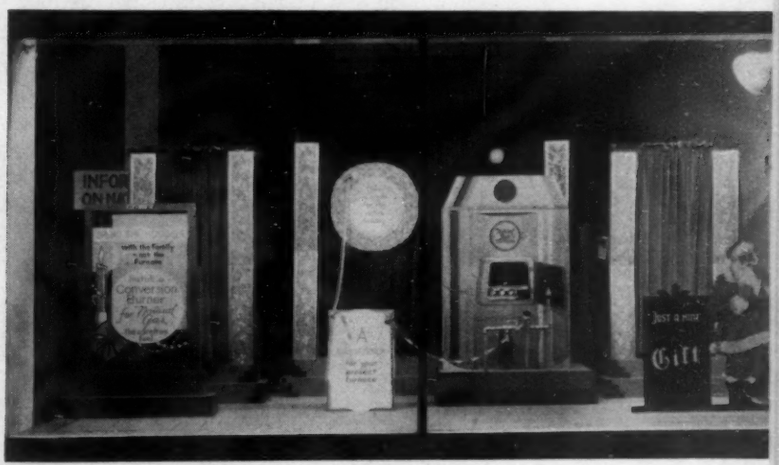
THE LACLEDE Gas Light Co., St. Louis, Mo., used a number of effective Christmas windows last year, with treatment in backgrounds typified by the view above—a modernistic note in keeping with the new in gas appliances.

BELOW: Seattle Gas Co. used this replica of a medieval European shrine, built on a high peak, last year on the sales floor. Its windows were lighted from the interior, and a loud speaker housed inside the shrine brought a 15-minute program of Christmas carols at hourly intervals throughout the day. This feature will "repeat" on the Seattle floor this season, due to its popularity last year.



A CONVENTIONAL Christmas theme is seen at its best in this Municipal Gas Co. window, used at Ennis, Texas, last year.





PACIFIC GAS and Electric Co. laid the emphasis on gas for home heating in the 1934 window which appears above.

The Southern CALCIUM BRINE

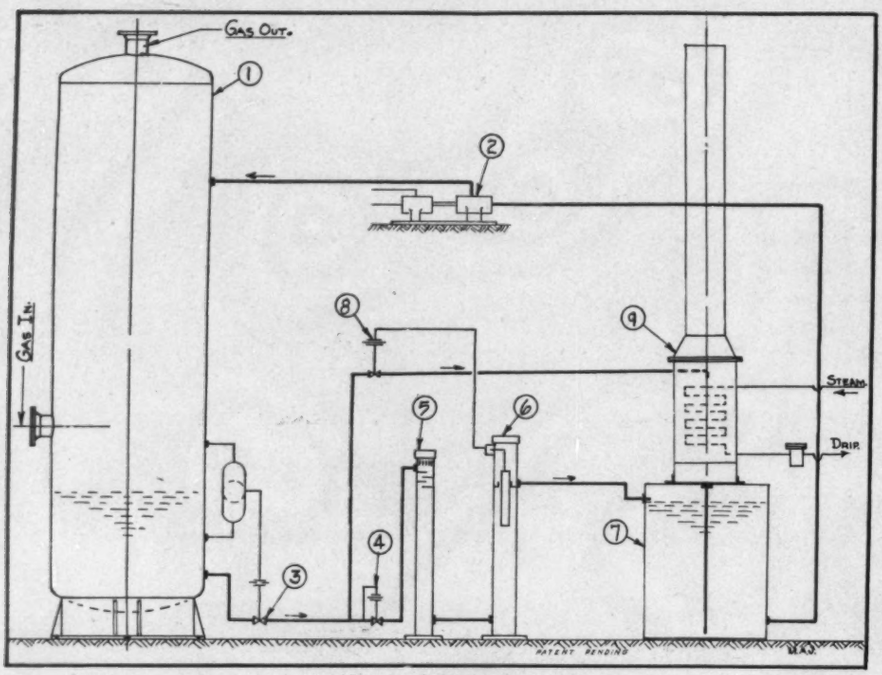


FIG. 1. Flow sheet for calcium chloride brine plant.

IN ORDER to improve the gas transmission facilities in its transmission line running from Ventura to Castaic, the Southern California Gas Co. decided to further dehydrate the natural gas being delivered into its transmission system at Ventura. It was doubtful if the required degree of dehydration sought could have been obtained by the extension of the present atmospheric cooling towers now located at the compressor plant.

An investigation was made of the various methods of dehydration, and it was decided that the most economical means for accomplishing the required degree of dehydration was the use of a calcium chloride brine plant. Such a plant was built on the discharge line of the Southern California Gas Co. Station No. 50 at Ventura and placed in operation early in November of this year.

Operation of the calcium chloride brine gas dehydration system is based on the fact that solutions of calcium chloride, and a number of other substances, have an affinity for water sufficiently strong to cause them to remove it in vapor form from gases with which they come into contact. The higher the concentration of the solution, the stronger this affinity becomes. For example, if gas saturated with water vapor at a temperature of say 70° F. is thoroughly contacted with a water solution containing 35 per cent by weight of calcium chloride, the solution removes water vapor from the gas to such a degree that the gas has its dew point lowered to 50° F., a depression of 20° F.

The extent of this depression is independent of the pressure, and is nearly independent of the temperature, at which the contact occurs. If the contact temperature with a 35 per cent solution were 90° F., the dew point of the treated gas would be 69°F.; at 50° it would be 31° F. Thus, within ordinary ranges of contact temperature, the depression of the dew point of the treated gas below the temperature of the incoming saturated gas is dependent almost entirely upon the concentration of the solution. If the solution strength in the above cases were increased to 40 per cent by weight of calcium chloride, the dew point of the treated gas at 90° contact temperature would be 64°, at 70° it would be 45.5°, and at 50° it would be 26.5°. Under most conditions it is not possible to use a solution much stronger than 40 per cent, since the "freezing" or crystallizing temperature of the solution rises rapidly with the concentration in this range, being 7° for a 35 per cent solution, 44° for 40 per cent solution, and 68.5° for 45 per cent.

Plant Description

The apparatus required for treating gas by this method is quite simple. It consists of a contactor for providing thorough contact between the gas and the brine, a pump for circulating brine through the contactor and the rest of the system, and an evaporator for removing water from the brine as fast as it is extracted from the gas, thus keeping the concentration of the brine constant at the point necessary to maintain the desired dew point in the treated gas.

The flow-sheet (Fig. 1) shows schematically the arrangement of the elements of the system at the Southern California Gas Co.'s plant at Ventura. (1) is the contactor, similar in general design to the conventional bubble-plate absorbers used in natural gasoline plants. The gas enters the shell near its base, passes upward through the bubble plates, on which it is brought into extremely intimate contact with the brine, passes through a scrubbing element in the top of the shell which eliminates any droplets of solution which might rise from the top plate, and finally leaves the shell through the nozzle at the top, which is connected to the transmission line.

B. M. LAULHERE

The brine is pumped on to the top plate by the pump, (2); it passes on down through the contactor through overflows on each plate, and finally leaves the base of the shell through the float-controlled valve (3).

From this valve the brine passes to back-pressure valve (4), which holds a low back-pressure on the brine coming from the contactor. Most of the brine goes through valve (4) into the top of vent column (5), where the small amount of gas dissolved in the brine is either vented to the atmosphere or recovered for low-pressure fuel. From the vent column the brine flows into the base of the gravitometer (6), and finally into the solution storage or surge tank (7). The pump takes its suction from this surge tank, thus completing the main brine circuit.

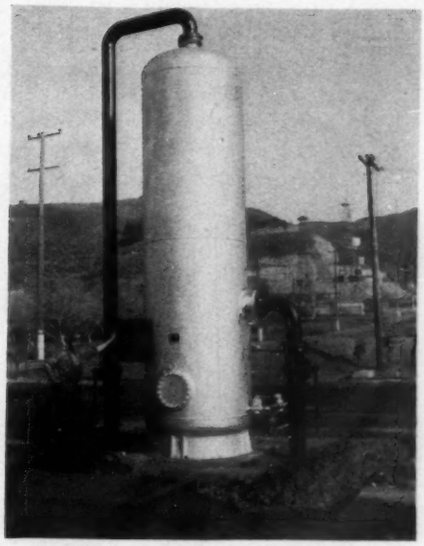
The gravitometer, with its associated apparatus, is provided to automatically

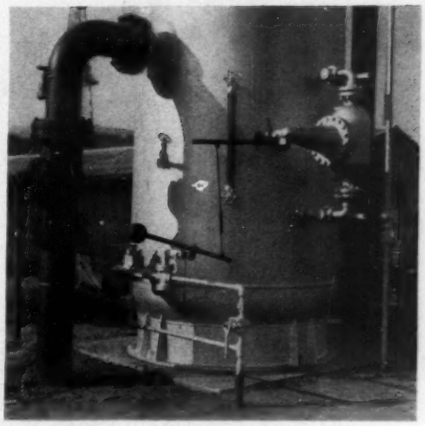
California Gas Company

CHLORIDE DEHYDRATION PLANT

By B. M. LAULHERE

Supervising Engineer, Southern California Gas Company

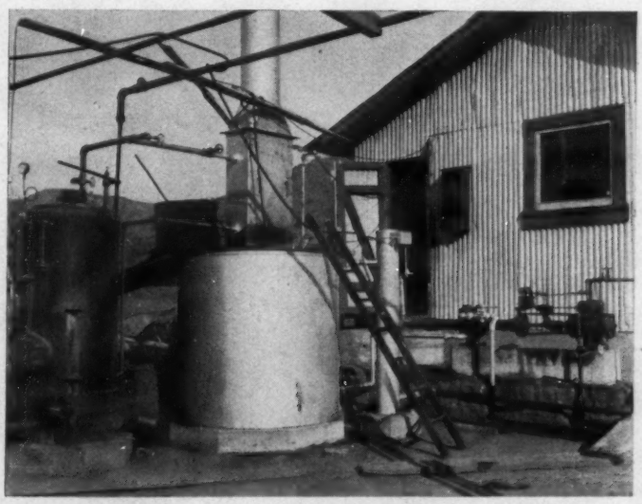


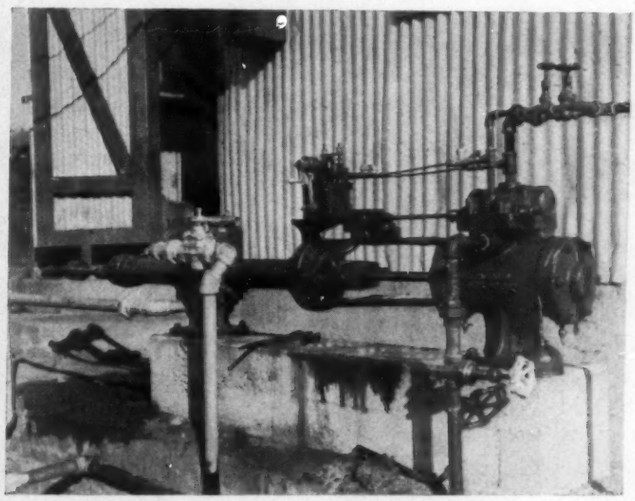


Gas is brought into thorough contact with calcium chloride solution in the above apparatus, which is similar in design to the bubble-plate natural gasoline absorber. The upper photograph is a general view of the contactor, and the lower view shows the contactor float control mechanism in detail.

maintain the brine concentration constant at the desired point. It contains a weighted float which, through an extremely sensitive pilot valve mechanism, controls diaphragm valve (8). This valve in turn controls the flow of a small sidestream of brine from the main circulating line upstream of the back-pressure valve (4). The opening of valve (8) permits brine to flow over the concentrator or evaporator, where water is removed from the brine by means of steam heat, the water vapor mixed with air escaping through the stack on top of the evaporator. If the strength of the brine in the system increases beyond the desired point, the float in the gravitometer rises, closing valve (8) through the float pilot control, and thus shutting off the flow to the concentrator. The brine in the system is then continuously diluted by the water absorbed from the gas, until the float sinks slightly, partially opening valve (8), and thus permitting just enough brine to flow over the evaporator to hold its concentration constant at the point for which the float is adjusted. Obviously, these operations are reversed if the strength of the circulating brine falls below normal, due to an increase in either gas load or in gas temperature.

It is interesting that the physical characteristics of this system cause it to adjust itself automatically to fulfill its purpose of preventing line condensation under changing weather conditions. During the summer the gas temperatures will run higher than during the winter, but underground line temperatures are also higher during the summer. By adjusting the dehydrator to maintain a uniform dew point depression of about 20° F., it has been found that, with reasonably good primary gas cooling, no line condensation will occur at any time. This is borne out by a year's experience with the system on the Montana Power Gas Co. line in northwest Montana, where atmospheric temperatures occasionally reach —52° F. during the winter, and go above 100° F. during the summer; all available data indicate that the same dew point depression will adequately protect lines under California conditions.





VIEW AT LEFT, reading from left to right, shows: Boiler solution surge tank with evaporator mounted on top, automatic gravitometer, circulating pump. RIGHT: Detail of brine circulating pump, powered by gas.

Muskegon Public Gets the "Truth About Cooking" in Ad-Series

By CRAIG ESPY Mid-Western Manager Western Gas

MUSKEGON Gas Co., Muskegon, Mich., removed its kid gloves recently when it published in the public press a series of 10 letters on "The Truth About Cooking." These letters were designed to correct a competitive situation tending to weaken gas in the eyes of the local public and to disturb the confidence of gas company salesmen in the very product they were being paid to sell.

The 10 messages—which refrained from pulling punches in the least way, but designated a spade as a pure unadulterated spade—were written in the first person and appeared on the Woman's Page of the local paper once a week for 10 weeks, over the signature of the home service director. They were set in format to resemble a letter.

Banner lines above each letter notified the reader that the complete set of letters was worth $5 in trade-in on a modern gas range, a gas refrigerator, an automatic gas water heater, or on central house heating equipment.

All letters were addressed to "The Homemakers of Greater Muskegon", the first one mentioning in the words of the home service director that she was unable to reach everyone through lectures and personal contacts, continuing with the statement that one of the questions most frequently asked of the director is, "Does the kind of fuel used make any difference in cooking results?" Answering this question, the copy ran:

"Good cooking results may be obtained in using any of the common fuels, if the amount of heat is accurately controlled.

"With any fuel the customer has control over cooking time; but as to temperature, gas and electricity are more readily and accurately controlled.

"Between gas and electricity, gas has a decided advantage. The gas range offers an infinite number of cooking speeds on its top burners as compared with three on the electric range. furthermore, the oven temperature regulator on a gas range controls oven heat more accurately than on an electric range."

The second letter of the series, dealing with comparative cooking costs, is reproduced in full, while No. 3 discussed "Waterless Cooking", as a subject abounding in interest for all homemakers. "When the waterless method is used," the third letter states, "the modern gas range with its flexible cooking top burners and perfectly controlled oven heat is the ideal appliance".

Concerning color and flavor of vegetables it stated that whether cooked over an electric element or over a gas burner, the color or flavor is the same.

"What have you heard about shrinkage of meats in oven cooking?" asks letter No. 4. "Has the electric range salesman told you that his range reduces shrinkage and preserves the natural flavor and juices in the meat? Has the gas range salesman told you that this is not so? If so, you may have been confused." Then follows the explanation:

"When heat is applied to meat there will be shrinkage because heat drives off moisture in the form of steam; it melts some of the fat, part of which passes off as vapor, while part of the fat melts and runs into the pan. In addition to these losses, there is always some loss of meat juices.

"These losses—if they can be called losses, for what the meat loses the gravy gains—cannot be avoided when meat is subjected to heat, regardless of whether the heat is supplied by gas, electricity, or any other fuel.

"As far as the meat is concerned, shrinkage depends upon the cut, size, shape, amount and distribution of fat, and the amount of bone.

"As far as the oven is concerned, shrinkage mainly depends upon the temperature at which the meat is cooked and the length of the cooking time.

"These facts are demonstrated in many tests reported by the U. S. Bureau of Standards, Home Economics Departments in colleges and universities, National Live Stock and Meat Board, and American Dietetics Association.

"No one can truthfully promise savings due to a reduction in meat shrinkage when using a fuel other than gas, because the modern gas range has the most accurate oven temperature regulator."

The cleanliness argument is subject matter for letter No. 5, with the introduction reading, "Everybody likes to be clean, everybody likes clean surroundings, and everybody likes to use things that are clean." To quote further from this letter: *(Continued on Page 60)*

SAVE THIS LETTER

It Is The Second Of A Series Of Ten And The Complete Set Is WORTH $5.00 TO YOU

(See rules below)

MUSKEGON GAS COMPANY
MUSKEGON, MICHIGAN

May 25, 1935

To the Homemakers of Greater Muskegon:

Time and again women ask me, "Which fuel costs the least when used for cooking?" This is a very important point and one on which all homemakers should be well informed.

The following costs were published recently by one of the largest and oldest domestic cooking appliance manufacturers in the United States:*

Average Cost of Fuels for Four People per Meal

Fuel	Amount of Fuel Required per Meal		Cost per Meal
Natural Gas	4.5 cu. ft.	$ .176 per C cu. ft.	7.92 mills
Kerosene	.060 gal.	.12 per gal.	7.20 "
Gasoline	.049 gal.	.183 per gal.	8.97 "
Bituminous coal	1.3 lbs.	8.50 per ton	5.53 "
Coke	1.4 lbs.	8.75 per ton	6.13 "
Electricity	.92 KWH	.02 per KWH	18.40 "

It is to be noted that in compiling this table, the highest rate which anyone in Greater Muskegon pays for gas is used, while the lowest available cooking rate for electricity is used; yet, it costs more than twice as much to cook with electricity as it does with the new natural gas.

Husbands may earn the money, but wives who manage to save a part of it deserve much credit, too.

Faithfully yours,

Anna Wochholz

Home Service Director.

*Name furnished on request.

This is the second of a series of 10 letters on "The Truth About Cooking." An additional letter will be published by Miss Wochholz in The Chronicle each Saturday until the series is completed on July 20th. Cut out each one and keep it. Any customer of Muskegon Gas Company turning in a complete set will be given an extra $5.00 allowance on a modern gas range, a gas refrigerator, an automatic gas water heater, or central gas housheating equipment, purchased from Muskegon Gas Company, or your dealer, between May 18th and August 31st. Only complete sets will be redeemed, and only one set can be turned in on each appliance purchased.

House Heating Fundamentals . . . . . No. 2 in a Series

THE CONTROL SYSTEM

By B. A. JOHNSON

Staff Engineer, Space Heating Division
The Peoples Gas Light and Coke Company

IF *you* had gas heat in your home and the equipment consisted of nothing more than a burner, similar to that on a gas range, and a gas pipe leading to it—and you intended to have an attendant on hand at all times to see that it gave you the equivalent of automatic gas heating service—what would your instructions be to the attendant?

First, you would undoubtedly tell him to see that the burner was on, or off, according to the temperature in the house; you would tell him to light it each time he turned it on, and not to turn it on when he had no means of lighting it. You would instruct him to turn it off or reduce the heat if the boiler or furnace got too hot before there was sufficient heat upstairs. If you had a fan on a warm air furnace, or a pump on a hot water system, your instructions would be to operate them at the correct times for proper heat distribution. You would also give any other instructions which you deemed necessary to obtain the best heating results from your particular system.

All of these tasks which you would instruct this attendant to perform are the things which should be accomplished by the *control system* on an automatic gas heating system. An adequate and efficient system of control not only gives satisfaction in heating comfort but also insures safe operation of the system. It is imperative, therefore, that controls be carefully chosen, properly coordinated, and correctly installed.

Controls on any gas heating system are divided into two classes:

1. *Primary Controls:* The first and most essential controls that any automatic gas heating system has. These are: (a) The Room Thermostat; (b) The Automatic Gas Valve; (c) The Automatic Pilot Light. (These are considered in detail at a later point).

2. *Secondary Controls:* These add to the refinement of automatic operation and to the safety of a gas heating system. They consist of:

(a) Limit Controls: Used to *close* the automatic gas valve when the temperatures, pressures, or other conditions reach undesirable or unsafe limits of operation. The different types of limit controls for various systems are:

B. A. Johnson

Hot water limit control.

Steam pressure limit control.

Warm air limit control.

Low water fuel cut-off.

(b) Low Limit Controls: Used to *open* the automatic gas valve, independent of room thermostat, to maintain a minimum system temperature, for the purpose of a finer temperature regulation. Different types are:

Low temperature control (Hot water and steam systems). Low air temperature controls (warm air systems).

Special thermostat features designed for refined room temperature control.

(c) Other Secondary Controls: Throttling controls, secondary air controls, individual radiator or duct controls, etc.

The Room Thermostat:

Its Purpose: The purpose of this device is to control the opening and the closing of an automatic valve when temperature conditions, in the room in which it is located, are such that heat should be turned on or off.

Its Construction: The sensitive element of the room thermostat is a strip of two dissimilar metals welded back-to-back into one piece (bimetallic strip) and usually bent into a curved form. One of these metals expands and contracts faster than the other when a change in temperature takes place and thus the bimetallic strip moves in one direction when the temperature rises and in the other direction when the temperature drops. One end of this bimetallic strip is firmly attached to the center of the thermostat case. The other end has a contact carrying blade and is free to move as changes in temperature take place, thus making or breaking an electrical circuit to turn the heat on or off. The construction of the thermostat also includes a movable indicator which can change the position of the free end in relation to the contacts, to provide for different temperature settings.

Operation: Thermostats operate in two ways:

1. *Directly* on the automatic gas supply valve, which, in such cases, is a small motor valve which when energized by the action of the thermostat causes the gas supply to be turned on or off.

2. *Indirectly* on the automatic gas supply valve, by opening or closing an auxiliary valve which allows gas to pass to a diaphragm valve or pilot operated valve, and open or close it by pressure or heat.

Its Adjustment: Two kinds of adjustment are necessary for any thermostat:

1. The differential adjustment (proper range between "on" and "off"):

This differential adjustment calls for a difference of 2° between the point at which burners go on and the point at which they go off. (Assuming a differential of 2° and a desired temperature of 70°, the burners should turn on at 69° and shut off at 71°).

If contacts are adjusted so that the differential is much less than 2° (with new type thermostats such as heat-accelerated and heat-anticipating, a closer differential than 2° can be obtained without creating undesirable "on" and "off" operation), the burners may go on and shut off too frequently—at less than 1° or so, the motor valve may open and close quickly from vibrations and sometimes cause "back-firing."

When the differential is more than 2°, temperature regulation is poor (too warm when burners turn off and too cold before burners go back on). The time between calls for heat would be lengthened with the result that the radiators get cold or the circulation of air stops, causing a cold feeling especially on the floor ("cold 70").

2. It is important that the sensitive part of the thermostat and the thermometer be properly synchronized:

This means that if the indicator is at 70° when the thermometer indicates a temperature of 71° or over, the burner should be off; and, when the thermometer reads 69° or less, the burner

should be on. If the thermometer reads less than 69° when the indicator is at 70°, and the burner is *not* on, the thermostat is synchronized too high in relation to the thermometer and the result most likely will be a complaint of "not enough heat." With this condition the burners shut off *before* the desired room temperature is reached.

When the above conditions are reversed and the burner is operating when the thermometer is reading more than 71°, with the indicator at 70°, the thermostat is synchronized too low in relation to the thermometer and the result would probably be a complaint of "too much heat" because the burner was not shutting off when the desired room temperature was reached.

Locating the Room Thermostat: The room thermostat is intended to anticipate the heating requirements in the space being heated, and unless it is properly located it will either cause the burner to shut off before sufficient heat is had or keep the burner on a great deal more than is necessary. In the one case causing unsatisfactory heating and in the other, wasting gas and increasing the cost of operation.

The usual location of the room thermostat is about 5 feet above the floor on the inside wall in the room most generally used (probably the living room or the dining room).

It is obvious that the thermostat cannot anticipate the desired heating requirements if it is located in such places as:

1. On an outside wall, or on a wall not heated on both sides day and night, where it would be influenced by cold walls and would not, therefore, shut the burner off at the proper room temperature.

2. On a wall that was absorbing heat from a duct, pipes, or a chimney, where it would be kept satisfied when room temperature was actually below that desired; or, similarly, near a floor lamp or where the sun's rays could strike it.

3. Near windows opened frequently or where cold drafts prevail, in which case it would call for heat while the air temperature was still at a comfortable degree.

"Clock Control" Thermostats: Clock thermostats are used to automatically lower temperatures at night and restore the desired daytime temperature in the morning. This type of thermostat can be arranged to change temperature settings any time and several times during a 24-hour period. The clock mechanism accomplishes this by the shifting of the indicator to the desired temperature at the desired time.

Occasionally it happens that the trip which causes this shift is accidentally tripped in which case the next shift is in the wrong direction. Unless this is corrected, temperatures will not be as desired.

Where the night temperature setting is made for 60° or less, it sometimes happens that it will take too long for the room temperature to build up in the morning. This can be corrected either by setting the tripping cam for an earlier shift to daytime temperature, or by setting the night temperature at 65° instead of 60°.

Use of the Proper Thermostat: There are three types of thermostat installations, each of which has a distinct principle of operation. They are:

1. Two wire.
2. Three wire—direct-acting.
3. Three wire—indirect-acting.

The type of thermostat used for any particular installation is dependent on the type of automatic valve used. Burner equipment using the motor valve in most cases calls for a direct-acting thermostat. Equipment using the gas-actuated diaphragm valve usually has the indirect-acting type of thermostat. Two-wire thermostats can be used in connection with either type of valve.

This Month's Cover

PORTLAND Gas & Coke Co.'s "Three Little Pigs and the Big Bad Wolf" window, which is seen on the front cover of this month's issue, stopped the holiday crowds in front of Gasco headquarters last year in Portland, Ore. The display shown on our cover is one of three scenes making up the window. The figures were animated, and at all hours of the day shoppers were to be seen around the window, chuckling as the wolf went through his "huffing and puffing" act. Adjacent windows were given over to attractive displays of modern gas equipment.—EDITOR.

The Automatic Gas Valve:

Its Purpose: The purpose of the automatic gas valve is to turn the gas on and off in response to the demands of the various controls which are connected to it.

The Types and Operation of Each: There are three types of automatic gas valves:

1. *Electrically Actuated:*

(a) Motor Driven: Which opens by action of an electric motor connected to a valve through a train of gears, and closes by spring action when the motor current is turned off by the controls.

This valve should open smoothly, as indicated by a uniform speed of the gear train, and close quickly and completely when the energy is shut off by the controls. It can be operated as a manual valve when no electrical energy is available, by a manual latch. When the energy is restored the valve becomes automatic.

(b) Solenoid Valve: The solenoid valve operates by the action of a magnetic coil on a plunger which is connected to a valve. It is generally used in connection with a main diaphragm or mechanical valve controlling the gas flow to the diaphragm or to the pilot supply controlling the power element of a mechanical valve. There are two types of solenoid valves:

(1) A valve which is opened by a magnetic coil and which closes by gravity. In this type the current is on all the time the valve is open.

(2) A valve which requires one magnetic coil to open it and another to close it. In this type, the current is only on during the opening and closing periods and an interruption of the current would leave the burner either "on" or "off," depending upon whether it was on or off at the time of the interruption of the current.

In the wiring of the "reverse-acting" solenoid valve, it is important that the connections be made so that it shuts off the supply of gas to the diaphragm to turn the burner on, and opens to turn the burner off.

Some direct-acting solenoid valves have a small by-pass to allow some gas to flow even when the valve is closed. Care should be taken that the amount of gas allowed to pass through this by-pass is correct for the purpose it is intended to accomplish.

2. *Gas-Actuated Automatic Gas Valves:* This type of valve operates by the action of gas pressure on either side of a flexible leather diaphragm the movement of which actuates a valve controlling the gas supply to the burner.

3. *Mechanical Valves:* The most commonly known gas valve which operates by mechanical action is the type operated by the heating and cooling of a power element. Pressure created by heat on this power element opens the gas valve and the release of this pressure caused by the cooling of the element when heat is removed, closes the valve. *(Continued on Page 38)*

Striking stage set for cooking schools held in theatres by Los Angeles Gas and Electric Corp. Oversize meter dial (at right) shows exact cost of each cooking operation.

The Theatrical in Cooking Schools

By FRANK L. MOON

Domestic Utilization Engineer
Los Angeles Gas and Electric Corporation

DURING the past few years, several eastern and California utilities have displayed gas appliances in what have been called "model kitchens" or "sets", usually built up as two or three walls. These are not sets in the true sense nor are they model kitchens. However, being suggestive of a kitchen they have served a most useful purpose. Attractiveness of design and use of color in keeping with the design have permitted the display of appliances to a much better advantage than by any other means at our disposal.

FRANK L. MOON

In every instance, wherever a model kitchen has been used there has been an enlivened interest, not only on the part of women but also men. The newest in kitchen cabinet style and arrangement and correct relationship of the range and refrigerator to working surfaces, storage space and sink, coupled with attractive finishing, have proved to be a drawing power. Fully 40 per cent of those visiting an exhibit of this kind are interested in the appliances displayed as well as in the kitchen layout, which might be expected to dominate.

In numerous instances these sets or model kitchens, whichever term is preferred, have been used by home economists as a working background for cooking schools. Invariably, however, the arrangement has been permanently fixed in a location which has been used continuously as a cooking school. To provide a background of this type for cooking schools to be held in various localities on a utility system would require quite an investment.

The Los Angeles Gas and Electric Corp. was confronted with this problem. For some time cooking schools had been conducted from the stages of neighborhood theatres throughout the territory served and other well located auditoriums. There was a similarity between this procedure and the playing of a theatrical circuit. A built-up model kitchen would have been impractical to move from one location to another. Considerable finish damage would occur each time the kitchen was dismantled and erected, which would require a constant retouching and perhaps even major repairs. The fact that these cooking schools actually played a picture house circuit finally suggested a solution. It was suggested that a theatrical set could be provided which would be comparatively easy to erect and take down to move to another theatre.

The result was the designing of such a set by the writer and the building of a model at 1-inch scale for the purpose of presenting it to the management. The design was accepted and a contract let to a scenic company specializing in theatrical scenery construction. It was built according to plans, painted a neutral color and well lighted over the sink, range space and planning desk. The cost was less than half that of a built-up kitchen set such as is usually used for cooking schools.

The neutral color of the set permits quite a range of coloring effect through

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JOB TRAINING to Improve Quality of House Heating Service on Peoples Gas Light and Coke System

By ARTHUR F. DODGE, Ph. D. Assistant Professor of Industrial Education University of Illinois

PROFESSOR DODGE has had a wide experience in the field of industrial training, including the training of instructors for the shipyard trades with the Emergency Fleet Corp. during the World War. He was formerly in charge of foreman-training for the Footwear Division of the U. S. Rubber Co. and later was employed by the Board of Education of Grand Rapids, Mich., to organize and conduct foreman - training courses for the factories of that city. In 1926 after five years of this work he accepted his present position with the University of Illinois. Since 1926 he has spent his summers as a consultant on industrial training—this summer with The Peoples Gas Light and Coke Co.

—EDITOR.

JOB training is the direct responsibility of the department involved, and this responsibility can never be shifted to a centralized training division. Fortunately, there are very few department heads who wish to turn over this responsibility as they feel that they are more competent than the training division to provide effective job training. This attitude on the part of department heads is justified and seldom is a centralized training division requested to carry on activities beyond its proper sphere. The centralized training division should confine its activities to helping only in the job training which the department head directs and for which he is responsible. Some of the ways in which a centralized training division may help in such job training are as follows:

1. Train instructors who are later to carry on the specific job training.

2. Assist in preparation of manuals of standardized procedures.

3. Assist in organization of text material, demonstrations, or laboratory exercises which may be used as a basis for group or classroom teaching.

During the past summer the job training program of The Peoples Gas Light and Coke Co. has been directed primarily at improving the quality of the house heating service, with special emphasis on customer relations. As service men are under the supervision of the distribution department, the training is largely concentrated within that department. Organized training, however, is by no means new in this department. In 1931, faced with the problem of training men to care for the adjustment of appliances necessitated by the change-over from manufactured gas to a mixture of natural and manufactured gas, this department organized a school with 51 instructors. In this school over 1,800 men were given a course consisting of full time work for one week. William J. Buckley was in direct charge of this school and the plan was described by him in a paper presented at the ninth annual Distribution Conference of the American Gas Association at Birmingham, Ala., in 1932. A somewhat briefer description of this school was published by William G. Rudd, vice-president in Charge of Operations, in the January 1932 issue of *Western Gas*.

Hardly was the problem of the change-over out of the way when the rapid increase in house heating installations forced upon the distribution department the necessity of training men to service these heating plants. Mr. Buckley continued in charge of this training also, and competent house heating service men were rapidly developed. However, the constant changes in design of heating plants and controls, and the desire of the company to offer the public more efficient service has necessitated a continuation of this training program. This summer's program in the distribution department is simply a continuation of this house heating service training with Mr. Buckley in direct control and reporting to the superintendent of distribution—the centralized training division assisting him in the three ways listed at the beginning of this article.

The training of instructors is probably the most valuable contribution that a centralized training department can make to a departmental job training program.

A good instructor (a) must be a competent workman on the job for which he is offering instruction, (b) he must also be conscious of all details of this job, and (c) be able to teach or "get across" his ideas and skills to another. Potential instructors who already possess the first of these three qualifications should be selected by the department in which the job training is to be done, and it is then the responsibility of the centralized training department to provide these selected men with the other two qualifications.

At first thought it may seem that a competent workman must necessarily be conscious of all details of his job. However, this is not true. Almost invariably a skilled worker is actually ignorant of just how he performs many details of his job, and the more skilled the worker, the more likely this is to be true. Constant performance of certain duties in time relegates these acts to the field of habit, and the conscious mind actually forgets how the acts are performed. Skilled workers frequently must pick up their tools and actually do the job before they can become conscious of just how they have been accustomed to do the work. Job analysis is the process by which a man may become conscious of all details of his work.

The third qualification of a good instructor, that of being able to teach, is generally recognized as an ability which many good workmen lack. To be sure a few people seem to have a natural aptitude for teaching, just as some men seem to be "born" mechanics, but the ability to teach may be learned the same as any trade—and teaching really is a trade.

The service men of The Peoples Gas Light and Coke Co. work out from three district shops with a district superintendent in charge of each shop. From each of these districts were selected 16 of the most competent house heating service men who are to act later as instructors of new or less experienced men.

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Condensation in Chimneys Subject of Ames Discussion

• ROBERT F. GALPIN, Iowa Electric Co., Muscatine, Iowa; addressing Mid-West Gas School and Conference, Iowa State College, Ames; November, 1935—(Abstract by WESTERN GAS)

THE subject of condensation in chimneys where natural gas has been introduced for heating purposes will require increasing attention to eliminate its deteriorating effect on chimneys, staining of walls, etc.

Typical cases of these difficulties have been met with in converted hot air furnaces and hot water boilers, and gas-designed furnaces, all equipped with the A.G.A.-designed back draft diverters. These jobs all have very short stack connections, and the remedy being tried is the installation of salt-glazed sewer tile as a chimney liner, with the bells up. The installation method was to open the chimney on one side in the basement and insert and plumb the first two sections, the balance being lowered into place from the roof. As far as can be determined from their short period of service, since the late summer of 1935, these installations are functioning satisfactorily.

Professor Paul E. Cox, head of the Ceramic Engineering Department of Iowa State College, in a paper at the Ames meeting entitled "Better Chimneys for Gas-Heated Homes," attributes the difficulty to traces of sulphur in the natural gas, with consequent formation of sulphuric acid in water solution.

The ordinary vitreous flue liner, either butt joint or bell, is not satisfactory because neither the liner itself, nor the mortar, are resistant to thermal shock, and the joints will eventually open and allow the objectionable liquid to leak out. The flue liner should be made, for use with all fuels, of thermal shock proof proportioned materials, with a bell inside to protect a suitable fire and acid proof mortar, and to cause the acids produced by natural gas to drop down and inside the chimney rather than to work through the joint.

To cope with the problem in existing chimneys, a chemical trap is suggested, whereby a baffling system will cause the gases to sweep over a chemically basic material which will remove the acid. A high temperature wax is also suggested as a remedial measure.

The Milwaukee Gas Light Co. has published a pamphlet of Architects' Special Information on Gas-Fired House-Heating Installation, referred to in connection with this feature on the Ames program, excerpts from the pamphlet following:

Condensation difficulties can be avoided with the use of perfect No. 1 salt glazed standard sewer tile for flue tile lining. Unglazed, butt joint tile will not give the desired results. The sewer tile lining should start at the very footing of the chimney and continue throughout its entire length. The bells of the sewer tile should always face upward, as the flow of condensation is toward the bottom of the lining.

Wherever an offset occurs, sewer tile offset angle fittings should be used. Great care should be exercised by the mason contractor in setting the lining so that there is no possibility of even the slightest leak. Cracked or imperfect tile should never be used.

Cutting of the lining to admit vent pipes should never be permitted. Wherever an opening is desired, a tee joint should be used the three openings of which are the same size as that of the lining. The opening for the cleanout should be made in the same way. After having left a tee joint for an opening, if it is found that the bell of the side outlet does not reach the surface of the chimney, a piece of glazed sewer tile should be cut so that when it is installed in place it will reach the surface and be even with it.

The cement or mortar to make up the bell and spigot joints should be an acid proof material, used as specified by the manufacturer. It is not sufficient to use a so-called acid-resisting mortar.

The last piece of sewer tile making the top end of the lining should have its bell removed and extend 8 to 10 inches above the masonry housing. It is well to bank up the top of the chimney. The material used for this banking should be acid proof. After having banked up the top, a 3/16-inch or heavier sheet lead cap should be placed on the banking materials, covering over the entire top and fitting snugly around the extended sewer pipe.

The chimney lining housing may be constructed in any form of standard materials. The chimney, of course, should extend upward sufficiently so that it reaches above any other surrounding buildings and gables to obtain a good up-draft.

The first joint of tile at the bottom of the chimney serves as a collector for the condensation. This collector should be connected to the sewer, through a trap if necessary. The drain pipe connection should be made at the side of the collector to permit precipitation of solids in the collector. The solids can be removed from time to time through the cleanout door.

Reducing Production Costs at Seattle

• GEORGE R. HORNING, Seattle Gas Co.; addressing Pacific Coast Gas Association Northwest Regional Conference, Tacoma, Wash., July 11-12, 1935—(Abstract by WESTERN GAS)

WHILE no all-inclusive generalization can be made on this subject with respect to the large and small plant, or oil gas, water gas or coal gas plants, it can be said that gas manufacturing is becoming more and more a technical business operating under accurate chemical control, and requires intelligent employees, reasonably paid for being capable of doing the work required; also that "good housekeeping" in a plant is almost universally a sign of good operation which, in turn, means lowest costs and best possible employee morale.

The Seattle Gas Co. has a combined oven and water gas plant, the oven plant making one-third to one-fifth of the send-out depending on the time of year. The water gas plant consists of five 9-foot and one 8-foot 6-inch sets, all formerly equipped with checkered carburetors for Diesel oil enrichment. Late in 1933 three of the older sets were changed over by the enlargement of connections, the installation of back runs, cone bottom wash boxes and automatic operation with automatic hold out, dependent on superheater temperature, for the use of heavy oil in Ignition Arch carburetors under patents belonging to Semet-Solvay Engineering Co. This ignition arch installation consists of emptying the carburetor, to the floor, of checker bricks and supports, and building two arches of highly refractory material at right angles to each other across the top of the carburetor, with their tops about even with the bottom of the generator connection. Water cooled sprays are introduced at four points around the circumference about 5 feet from the bottom, and turned up at 45 degrees—the intention being that the oil will be sprayed in a very finely atomized stream against the stream of blue gas from the generator and that

radiant heat from the walls of the carburetor and the sensible heat of the blue gas will vaporize the oil, which vapors are then carried through the superheater and fixed.

This type of installation worked very well in Eastern tests with paraffin base oils, but usage of California asphalt base oil produced immense carbon deposits on the side walls, under the arches and on the floor of the carburetor; there was also formed a very heavy viscous tar emulsion containing 65 to 85 per cent of water, and operation was very erratic so that at one time great quantities of lampblack would appear in the set take off and wash box seals and, at another, fixing was insufficient and there was a tremendous drop of light, oily condensate. After the first test runs fire conditioners were installed, these being hydraulic rams 3-feet in diameter and with 30-inch stroke, placed in the ash pan so that by extension the clinker formation in the lower part of the fire could be broken up.

The operating problems were gradually overcome. It was found better to spray a considerable portion of the enriching oil upon the fire rather than in the carburetor, and a re-design of carburetor sprays was also found helpful. Frequent use of the fire conditioners was found undesirable, as an open fire in the center was the result, and finally the conditioners were removed and the sets operated in accordance with standard water gas practice. From then on the free carbon content of the tar dropped from an average of 17 to 11 per cent and its abrasive qualities disappeared to a considerable degree; the character of the producer and blue gas became stable; no further difficulties with oil in the ash pan were encountered; and the wash box and take-off pipe troubles practically disappeared. The cost of fuel and oil at the present time is running at 4¼ cents per thousand less than corresponding costs on the Diesel sets, which is a very considerable saving.

There has been an interesting partial development of a new method of dehydrating tar worked out by the Western Precipitation Co. of Los Angeles. Essentially this apparatus consists of a cylindrical shell containing vertical tubes set in a head at the upper end. In each tube is suspended a wire electrode. The tar is pumped to the tubes and a high voltage field created around the wires, the apparatus being similar in many ways to the Cottrell for the precipitation of liquids or solids from gas or air. The apparatus in Seattle has a capacity of 200,000 gallons per hour. It has been found that mixing caustic soda with the emulsion at the inlet of the precipitator facilitates the agglomeration of the water particles. Considerable instantaneous separation of water occurs in the apparatus and there is further separation when the tar is allowed to stand after treatment and kept at fairly high temperature. Under certain conditions 65 per cent emulsion dehydrates to as low as 20 per cent, but the average obtained is about 30 per cent water content. This is sufficiently low to make possible burning the tar without the use of a solid fuel fire. The operation of the dehydrator requires practically no attention.

Service Problems in House Heating and Commercial Installations

● K. E. GRAF, Northern Natural Gas Co., Omaha, Neb.; addressing Mid-West Gas Association 1935 Convention—(Abstract by WESTERN GAS)

A QUESTIONNAIRE was sent out to various gas companies located in the Middle West, covering a variety of service problems. The answers to this questionnaire are as follows:

Question No. 1: What three troubles in house heating installations cause the greatest percentage of service calls?

By far the largest percentage of calls was caused by safety pilots or just pilot lights alone, as much as 80 per cent in some areas. The causes were dirt and foreign matter clogging the small orifices, and drafts blowing out the flame when the burner was not in operation.

Successful remedies have consisted in reaming out the small orifices, installing a small filter in the pilot line, adjusting the pilot to a soft blue flame, and raising the pilot light from 1 to 2 inches higher than its original position.

While pilot lights apparently give the most trouble, there are other service troubles that predominated in certain areas. Thermostats were major offenders but were comparatively easy to remedy as their failure was usually caused by dust on the points, and the education of customers in their proper use has been a big factor in eliminating these calls.

Question No. 2: What kind of trouble has been the hardest to correct?

Again pilot lights were the chief offender. Taking 12 representative companies comprising a total of approximately 20,000 installations, 7 of these 12 reported having more difficulty with pilot lights than any other of the numerous troubles. In the case of the remainder of the 12 companies who did not list pilot lights as the hardest thing to correct, draft troubles, thermostatic adjustments, poor air circulation, excessive condensation and automatic controls were causing extra calls.

Question No. 3: Do draft changes cause much trouble and has automatic draft control helped to eliminate any of your troubles?

One company having 700 domestic installations and a large number of commercial jobs such as building heating, etc., has found automatic draft control of considerable help, particularly on commercial installations. These draft stabilizers have been of the greatest benefit in the down town section where unusual draft conditions prevail and such conditions are aggravated by tall buildings adjacent to the installation.

Two companies are now using an orifice type baffle in the furnace outlet instead of the usual method of baffling with bricks, and claim excellent results for this arrangement. These baffles are usually made of tin to fit the pipe and have various methods by which the size of the opening is adjustable.

Question No. 4: Has poor air circulation in hot air furnaces been a major difficulty?

This was a major trouble during the first heating season, but the majority of the companies have eliminated it by insisting that the customer's heating plant be properly designed and installed before the conversion is made.

After the conversion is made and this situation develops the first thought is to set the burner higher in the furnace, which has been particularly effective when using the luminous flame type of burner.

Question No. 5: Has excessive condensation been a major problem and what has been your remedy for this?

Out of 1100 installations in two different companies, only 24 cases of excessive condensation are reported, and out of all the answers received this condition was considerably in the minority compared to other service calls. When excessive condensation exists in the chimney the usual method has been to

reline the chimney either with Transite Lining, Wilder Metal, or an asphalt chromatic paint, or to keep a larger pilot flame burning in order to avoid a cold condition in the stack.

Excessive condensation in the house has been a fairly rare occurrence excepting where circulating heaters have been installed; however, it was found that this condition disappeared entirely when the flues were thoroughly cleaned and there were no obstructions to prevent a good draft.

Question No. 6: What per cent CO_2 does your service department strive for on house heating installations?

This question brought forth a variety of answers; 7½ per cent CO_2 was considered the minimum and 9½ per cent the maximum. A majority of the companies use the Orsat apparatus to check the job when it is first installed and a few using an Orsat as a method to indicate combustion efficiency when hunting trouble as a result of a service call.

Question No. 7: What is the maximum stack temperature you permit?

Most of the companies approached on this particular question stated frankly that they are not worried about the stack temperatures, it being their practice to get the burner and draft operating successfully and with these conditions satisfactory the stack temperatures would not be excessive. When a definite answer was given, 550° F. was the maximum allowed by any company.

Question No. 8: What type of hot air furnace has given you the greatest trouble to convert to gas firing?

The down draft type of hot air furnace and the type with the small back radiator have been the chief offenders. They can be successfully converted but frequently lead to high bill complaints. Another type is the small cheaper-built furnaces that do not have sufficient secondary heating surfaces.

Question No. 9: What in your opinion is the outstanding deficiency in present day house heating conversion burners?

The high cost of automatic controls, present methods of heat transfer, and poorly constructed pilot lights were the predominant ones listed. The high cost of equipment as pointed out by one company seems to have been brought about by too many complications and extra controls that to some, appear to be not needed.

Behavior of Metals and Protective Coatings in Southern California Soils

● **A. B. ALLYNE, Southern Counties Gas Co., in Pipe Protection Sub-Committee Report to Technical Section, Pacific Coast Gas Association Annual Convention, Pasadena, Calif., September 17 to 19, 1935—(Abstract by WESTERN GAS).**

EARLY in 1933 the Southern Counties Gas Co. selected what appeared to be the most promising of the corrosion resistant metals and protective coatings and placed them in two burial locations, one at Saticoy, Ventura County, Calif., and the other near Oceanside, San Diego County. The soils are both clays and thought to be typical of the most corrosive soils in the territory served. Soil stress action is particularly severe at the Oceanside site.

A. B. Allyne

Samples for the most part were applied to, or consisted of, 3-foot lengths of 2-inch pipe; a few were 3-inch pipe. Ends of all specimens were closed by cans filled with bitumen. Careful examinations, and electrical tests on the coatings, were made before and after burial. Twenty-eight different samples, in duplicate, were involved in the test, which covered a period of 2.42 years.

FIG. 1.

Results on the bare metal specimens are shown in Table No. 1. General conclusions from the coated specimens are as follows:

The advantage of an outer shield, either bonded or unbonded, over bituminous coatings, was very conclusively brought out; samples protected by external wrap of asbestos felt emerged in good condition, while those unshielded were badly cracked by soil stress; Fig. 1 shows an unshielded asphalt distorted

TABLE NO. 1. RESULTS ON BARE METAL SPECIMENS AT SATICOY AND OCEANSIDE BURIAL GROUNDS.

Kind of Metal	Saticoy	Oceanside
Cast iron—centrifugal, metal mold.	Large shallow graphitized spots—about 10 over surface, deepest is .030 in. Rest of pipe O. K.	Same as Saticoy.
Cast iron—horizontal sand cast—sand removed.	Surface generally covered with rust, but no graphitization.	Heavy surface rusting. Some very shallow graphitization.
Cast iron—horizontal sand cast—sand left on.	Same as above except less rusting. No graphitization.	General surface rusting, but very little graphitization. One pit is 0.045 in. deep.
Cast iron—centrifugal sand cast.	Apparently unaffected.	Same as Saticoy.
Copper	Localized mild pitting in few spots. Rest of surface tarnished only.	Surface tarnished and bright green in places. No local action apparent.
Steel	General surface rusting and mild pitting. Deepest pit 0.025 in.	*General surface corrosion and deep pitting. Deepest pit 0.062 in.
Steel	General surface rusting and but very mild pitting. Deepest pit 0.008 in.	*General surface corrosion. Deepest pit 0.030 in.

* 1.28 years old, others in Oceanside are 2.28 years old. Saticoy samples are all 2.42 years old.

FIG. 2.

by soil action. Coal tar enamels of 200° melting point were found to be cracked, indicating that this melting point is too high to withstand cold weather. Fig. 1 also shows that it is not effective to place a non-waterproof wrapper between the bitumen coats; in the upper right corner can be seen an area where the internal felt wrapper acted as a wick to absorb water and caused the bitumen to blister off. Concrete coatings disintegrated somewhat in the Saticoy soil as shown in Fig. 2, whereas at Oceanside no action was observed; an explanation of this is the high sulphate content of the Saticoy soil, indicating that a sulphate survey should be made before concrete coatings are installed.

Death Comes to A. F. Hockenbeamer, P. G. and E. Head

A. F. HOCKENBEAMER, president of the Pacific Gas and Electric Co. and one of the outstanding public utility executives of the country, died on November 11 of a heart attack. His passing terminates a remarkable career which included 16 years in the railroad business, 4 years in the financial world and 28 years with P. G. and E., the last 8 years as president.

A. F. HOCKENBEAMER

He was born at Logansport, Ind., March 6, 1871. His working days started at the age of eight, when he began selling newspapers and had various jobs outside of school hours. At 16 he began his career first as messenger boy and janitor then as stenographer in the division headquarters of the Pennsylvania Railroad at Logansport, in the mean time having managed to take a course in stenography. His superior was L. F. Loree, then division engineer, who is now head of the Delaware and Hudson and the Kansas City Southern railway systems. As Mr. Loree was was advanced he took Mr. Hockenbeamer with him, until he became in turn assistant engineer of maintenance and way, assistant general superintendent of motive power for the Baltimore and Ohio Railroads, and assistant to the president of the Rock Island-Frisco System.

After 16 years with the railroads, he became railway expert for N. W. Halsey & Co., Wall Street bond concern and predecessor of the National City Co. His duties soon broadened to include investigations of public utility companies, giving him a fundamental knowledge of their operation. N. W. Halsey & Co. held a large interest in the Pacific Gas and Electric Co., and, when in 1907 it agreed to underwrite a $6,000,000 bond issue for the company, Mr. Hockenbeamer was sent to make the necessary investigations. F. G. Drum, then president of P. G. and E., prevailed upon him to stay on for a year as comptroller. A few months later he was offered the post of treasurer and decided to remain in the face of an offer of a partnership in an internationally known banking firm.

In 1909, in his second year with the company, he became vice-president and treasurer and in 1927 was elected president. It is Mr. Hockenbeamer's financial guidance that made possible the company's program of expansion. Among his achievements is the customer ownership plan, instituted in 1914, and the employee installment purchase plan, which accorded him nation-wide fame and have since been adopted by utilities throughout the country. During the World War Mr. Hockenbeamer was publicity manager of the Twelfth Federal Reserve District in the several Liberty Loan drives. Among his recent appointments was that of consulting professor of public utility management on the staff of Stanford University.

Mr. Hockenbeamer is survived by Mrs. Ethel Pryor Hockenbeamer and two sons, Embree Frederick, Coast Counties Gas and Electric Co. engineer at Santa Cruz, and Ernest Pryor, Northwestern University medical student.

James B. Black, vice-president of the North American Co., has been elected to fill Mr. Hockenbeamer's place with the P. G. and E., as related on another page of this issue.

N. W. Natural Gas Corp. to Resume Drilling Test Well

Northwestern Natural Gas Corp., Seattle, Wash., has preparations under way to resume drilling on its deep test well in the Rattlesnake Hills natural gas field. Purpose of the well is to pierce the basalt formation, the project having been begun on the recommendation of the company's geologists, A. A. Hammer of Abilene, Texas, and F. P. Fisher of Mt. Vernon, Ohio. The Rattlesnake Hills field has at present about 15 producing wells, in the midst of which the test well is located.

Lone Star and United Gas Co. Supporting Anti-Gas Wastage Law

LONE Star Gas Co. and United Gas Co., two of the largest companies distributing gas in the state of Texas, are actively supporting the state in its attempt to uphold the anti-gas wastage law passed last May. Both companies are providing figures, geologists and other experts for the state as witnesses both in commission hearings and in court. Lone Star has followed a policy of ratable purchase of gas from all wells on an equal basis with company wells.

Frank E. Kendrick, geologist for Lone Star, testified at the Nov. 18-21 hearing before the Railroad Commission that underground wastage is a constant threat in all gas fields in Texas where conservation measures are not taken. He explained his company's experience in the Bend Arch Reservoir in Central West Texas where the company's ratable purchase policy and mechanical precautions had saved many wells in Eastland, Stephens, Brown, Palo Pinto, and other counties and had prolonged the life of gas and oil pools in that area.

Bulk of the testimony in the three-day hearing consisted of showing that there is constant underground wastage when there is a concentrated withdrawal of gas from a relatively small area. A new conservation order is to be drafted at once, and is expected to be issued early this month. At conclusion of testimony Warren Collins, Lone Star attorney, made a plea to end wastage above and below ground by strict compliance with the commission's orders irrespective of court action.

Cole and Kohloff Leave Montana for Canal Zone Gas Properties

R. E. COLE, formerly distribution superintendent of the Montana Power Co., left for Panama November 11 to take charge of the gas properties of the Electric Bond and Share Co. in the Canal Zone. His headquarters will be the Compania Panamena de Fuerza y Luz, Ancon, C. Z. W. A. Kohloff, former superintendent of utilization for the Montana Power Co. and, earlier, of the North Bay Division of the Pacific Gas and Electric Co., accompanied Mr. Cole to become superintendent of the Colon plant.

According to M. E. Buck, general superintendent of gas operations of the Montana Power Co., W. E. Tracy has been appointed distribution superintendent and W. W. German and S. E. Runser have been appointed utilization engineers and inspectors, all three reporting directly to Mr. Buck. M. A. Hardie has been assigned to the post of gas measurement engineer and is employed jointly by Montana Power Co. and Montana Power Gas Co.

Stamford & Western and Northwest Tex. Consolidated Under Community Natural

The Stamford & Western Gas Co. and the Northwest Texas Gas Co., effective September 1, were consolidated with Community Natural Gas Co. and are operating under the name of Community Natural, according to Chester L. May, vice-president and general manager of Community Natural. The consolidation did not involve changes in personnel nor in operating policies.

West Coast Industry Totals Up for 9-Month Period

A statistical statement released from Pacific Coast Gas Association headquarters last month covered gas company operations for the first nine months in 1935, compared with last year, for Arizona, California, Nevada, Oregon, Washington, and British Columbia, showing major gains in every classification.

Production rose 10.3 per cent; domestic meters gained 3.1 per cent and commercial and industrial meters 7.9 per cent; sales were ahead in most brackets—17 per cent for domestic, 19.6 for commercial and industrial, with a 28.3 per cent drop in sales for electric generation; total sales came to 109,487,130 M c.f. for the period, a gain of 10.6 per cent. Total revenues gained 13.2 per cent.

Detroit City Gas Co. Preparing for Texas Gas Supply

Following the recent consummation of a contract between the Panhandle Eastern Pipe Line Co. and the Detroit City Gas Co. for a natural gas supply to Detroit, representatives of the Detroit City Gas Co. are making a tour of various communities that have lately changed over to natural gas, gathering data in preparation for the change over which is scheduled for completion July 1, 1936.

The project calls for a 300-mile pipe line, which it is understood will take off at Dana, Ind., from the Panhandle Eastern main carrier through central Indiana.

New Schedule Lowers Arizona Edison Heating Rates 30 Per Cent

Arizona Edison Co. has instituted, effective with November billings, an optional residential rate in Bisbee, Douglas, Lowell and Warren, which lowers former rates approximately 30 per cent for heating customers and results in a schedule some 25 per cent lower than is available for natural gas at other points in the state.

Under the new rate the first 200 cubic feet is billed at $2, the next 4,900 at 65 cents per M c.f. and above 5,000 at 60 cents per M c.f.

Consolidated Gas Utilities Moves to Join Kansas Properties

Consolidated Gas Utilities Co., Oklahoma City, Okla., early last month filed application with the Kansas State Corporation Commission for permission to consolidate its Kansas utility holdings under one operating concern. Consolidated's Kansas properties include Rice County Gas, Electric & Power Co.; Mid West Gas Corp.; Larutan Gas Corp.; and Industrial Gas Co.

Arizona Offices of Western Gas Co. Moved to Tucson

D. H. Tucker, Arizona state manager for the Western Gas Co. which operates the natural gas pipe line serving principal centers of the state, has transferred headquarters from Phoenix to Tucson, where a state headquarters office is being installed at the city gate station. An office branch will be maintained at Phoenix for the time being.

Special Construction at Lone Star River Crossings

LONE STAR GAS CO.'S 110-mile, 20-inch, Long Lake-Cayuga-Irving pipe line, now under construction and scheduled for completion early next year, crosses the Trinity River twice. One of the crossings called for the laying of a 180-foot section of the 20-inch pipe. A trench was dug through both banks of the river and to a depth in the river bed so that the top of the pipe would be at a minimum depth of 4 feet below the bed of the stream. A profile was made for the length of the trench and the pipe was then shaped to the profile and the section assembled.

At each weld a special clamp was attached to provide weight to keep the line from floating and to assure a tight joint in the event of fracture in the weld. To further weigh down the section 2½-foot lengths of pipe about 24 inches in diameter were placed over the pipe between each clamp and lead poured into the annular space.

The section was then suspended over the river and cleaned by men working from a raft. A coat of grease, fabric wrapping, another coat of grease and a final wrapping of grease-impregnated asbestos were applied, and the pipe was lowered into the trench.

The new line will have a maximum daily capacty of 110,000,000 cu. ft. Over 60 carloads of enamel pitch and more than 2,280,000 feet of 18-inch asbestos felt wrapper are required for coating the line. Freight charges on these materials, couplings and similar items totalled $119,289, requiring 878 freight cars in all. Moving the old pipe used in the line called for 725 cars with freight charges of $56,252.

20-inch line at Trinity River Crossing.

Separation Made in Managements of Chicago Utilities

A SEPARATION between the managments of the two major Chicago utility companies was made effective late in November when James Simpson resigned as chairman of The Peoples Gas Light and Coke Co. and George A. Ranney was elected to assume the position.

Since June, 1932 Mr. Simpson has been chairman of The Peoples Gas Light and Coke Co. and George A. Ranney was elected Public Service Co. of Northern Illinois, and Mr. Ranney has been vice-chairman of the three.

In resigning the Peoples Gas post, Mr. Simpson is retaining the chairmanship of Commonwealth Edison and Public Service Co. of Northern Illinois. Mr. Ranney resigned as vice-chairman of the three to accept the position of chairman of Peoples Gas.

Mr. Simpson resigned from the chairmanship of Marshall Field and Co. to join the utilities in 1932 when he was called upon to succeed Samuel Insull in the positions named. Among other prominent positions held by Mr. Simpson are director and deputy chairman of the Federal Reserve Bank of Chicago, director of the New York Central Railway, director of American Red Cross and chairman of the Chicago Plan Commission.

Mr. Ranney came to the utility industry from the banking and manufacturing fields. At one time he was vice-president and treasurer of International Harvester Co., and still retains a directorship in this company. He was also offered at one time the chairmanship of the Continental National Bank & Trust Co., a position which he rejected. He is at present a director in the First National Bank of Chicago and member of the finance committee of the bank.

Samuel Insull, Jr., who has been assisting in the management of the three utilities, will confine his activities in the future to Commonwealth Edison and Public Service Co. of Northern Illinois.

In separating the managements of the companies the organization will apply for exemption from provisions of the Public Utility Holding Company Act of 1935. The only other director who is a member of the board of Commonwealth Edison and Peoples Gas is Sewell L. Avery, president of Montgomery Ward.

Commonwealth Edison has the sole distribution of electricity in Chicago with Peoples Gas occupying the same position in the area with respect to gas. Public Service Co. of Northern Illinois sells both gas and electricity in Northern Illinois counties outside of the Chicago area.

Wichita Falls Gate Station Moved

The United Gas System recently moved its gate station from Wichita Falls, Texas, to Iowa Park, a short distance away. A. A. Spence is in charge of the station.

"Heating for Health" Campaign Getting Good Reception

LONE STAR Gas Co.'s "Heating for Health" campaign, launched late in October, is being enthusiastically received by employees and customers, according to W. C. Grant, Lone Star advertising director. This campaign is unique in that it does not include any attempt to sell heating merchandise.

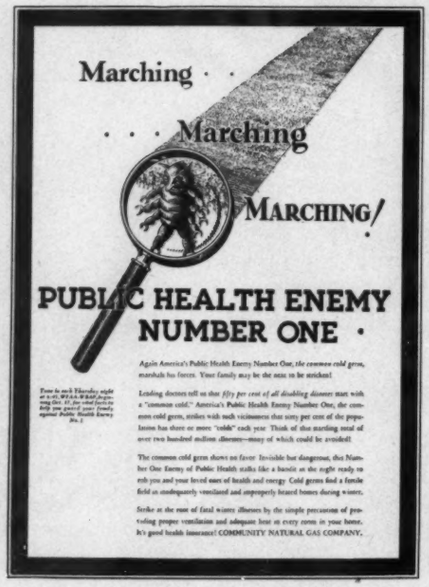
The central theme of the program is that poor house heating and inadequate ventilation are the causes of much of the prevailing winter illnesses such as colds, pneumonia and related ailments. The purpose of the campaign is to educate customers in proper heating and ventilating methods as a health protection measure.

Temperature changes in the Southwest are frequently sudden during the winter, temperatures sometimes dropping as much as 40° in an hour. In addition to these frequent fluctuations of weather, which often catch the customer unprepared, the long warm season, ranging from the latter part of April or early May through October, induces a laxity in heating habits. A custom of huddling in one room with no ventilation, passing from such an overheated room into cold hallways, and a general tendency to heat only one or two rooms, leaving the remainder of the house cold, produce what heating engineers and physicians believe to be a condition conducive to colds.

The theme for the "Heating for Health" campaign was originated by Chester L. May, vice-president and general manager of Community Natural Gas Co., Lone Star subsidiary. The principle instruments of the campaign are newspaper advertising, radio programs, employee training and a booklet entitled "America's Public Health Enemy Number One". The campaign was prepared by Willard G. Wiegel, Lone Star Gas Co. advertising manager, who wrote the newspaper copy and the booklet. Miss Margaret Marable of the advertising department wrote the scripts for the broadcasts. T. R. Thompson and Leslie Caldwell handled newspaper publicity and other details.

Newspaper advertising opened the week of October 6 with a 5-column 14-inch advertisement introducing the cold germ and heralding its aproach with the coming of winter. This first installment, reproduced in the accompanying illustration, depicts the vast army of cold germs marching forth to attack residents in poorly heated homes. The second advertisement showed a girl blowing her little brother's nose, these two figures appearing against a background of huge letters spelling C-O-L-D-S. A third installment showed an ambulance speeding to the hospital with the caption "A Cold Caused This", the intention again being to impress the public with the gravity of improper house heating. The advertisements are running in some 250 newspapers at the rate of about three or four a month throughout the heating season, which lasts into March.

The booklet, "America's Public Health Enemy Number One", is a concise statement of medical facts relating to colds and the results of improper protection in the home, treating also of wall sweating, the importance of proper air circulation, the dangers to health of several people huddling together


Marching · ·
· · · Marching
MARCHING/
PUBLIC HEALTH ENEMY
NUMBER ONE ·
Again America's Public Health Enemy Number One, the common cold germ, marshals his forces. Your family may be the next to be stricken!
Leading doctors tell us that fifty per cent of all disabling diseases start with a "common cold." America's Public Health Enemy Number One, the common cold germ, strikes with such viciousness that sixty per cent of the population has three or more "colds" each year. Think of that startling total of over two hundred million diseases—many of which could be avoided!
The common cold germ shows no favor. Invisible but dangerous, this Number One Enemy of Public Health stalks like a bandit at the night ready to rob you and your loved ones of health and energy. Cold germs find a fertile field in inadequately ventilated and improperly heated homes during winter.
Strike at the root of fatal winter illnesses by the simple precaution of providing proper ventilation and adequate heat in every room in your home. It's good health insurance! COMMUNITY NATURAL GAS COMPANY.

in one room and urging that the entire home be heated rather than just one or two rooms.

A number of physicians have been enlisted for radio programs and have not only willingly cooperated but have developed much of the material. Several physicians in private practice and city health officers are to give talks on the radio programs which go on the air every Thursday evening at 6:30 from Dallas. The programs are 15 minutes in duration with music and dialogue. The medical facts in reference to colds which form the basis for the campaign were developed by a medical student at Baylor Medical College at Dallas, who was hired to digest all known medical authorities on the subject of colds.

Middle West Utilities Co. Reorganized

REORGANIZATION of the Middle West Utilities Co., keystone of the former Insull utility group, after three and a half years of litigation, was finally approved November 27 by Federal Judge James H. Wilkerson, the new company to be known as the Middle West Corp.

The new corporation is an investment management company rather than a utility holding company, its directorate being dominated by former creditors. Capitalization will consist of 3,621,514 shares of capital stock, 1,710,000 of these to be given to secured creditors in settlement of claims, 1,290,000 shares of pledged collateral to be given to holders of $40,000,000 in serial gold notes to satisfy their claims, 151,928 shares to holders of preferred stock, 158,829 shares to holders of common stock, and 310,757 shares to be reserved to warrants covering holders of the old preferred and common stock.

The initial board of directors of the new corporation, composed of creditors' and stockholders' representatives and two members appointed by the court, consists of Hugh McGee, vice-president of the Bankers Trust Co. of New York; J. Q. Adams, director of the Continental Illinois National Bank & Trust Co; Irvin L. Porter, vice-president, First National Bank of Chicago; Willoughby G. Walling, Reconstruction Finance Corp.; Chas. S. Dewey, chairman Middle West Utilities Note Holders Committee, and Robert N. Golding, counsel for the Committee; Adolphe Boissevian, representing the committee of preferred stockholders; Daniel C. Green, trustee of the company under the bankruptcy proceedings; and Walter A. Shaw, public utility engineer and appraiser called in by the court.

Officers of the corporation elected at the first directors' meeting held November 27, are Daniel C. Green, president; John E. Barber, vice-president; N. P. Zech, comptroller; Oliver E. McCormick, treasurer; Gail Belden, secretary; and C. C. Hermann, assistant secretary and assistant treasurer. Ralph D. Stevenson was appointed counsel.

A committee on reorganization has been formed to incorporate the new company and to manage the exchange of securities. Members of this committee are Abner J. Stilwell, vice-president of the Continental Illinois National Bank and Trust Co.; Irvin L. Porter; W. C. Freeman, vice-president of Central Republic Trust Co.; Chas. S. Dewey and Adolphe Boissevian.

House Heating and Water Heating Stressed in Denver Campaigns

PUBLIC Service Co. of Colorado, Denver, in a gas house heating and automatic gas storage water heater campaign from September 1 to November 12, sold 366 house heating installations and 314 storage water heaters, according to Roy G. Munroe, gas new business manager. An airplane trip to New York is offered to the house heating representative taking the greatest number of orders during the last four months of this year, and a similar trip to the domestic gas representative ranking highest in sales of storage water heaters.

The company began the year with slightly more than 37 per cent of the houses in the Denver district equipped with automatic gas storage water heaters, and to date has sold 1,391 since then, bringing the present saturation up to nearly 40 per cent. About 16 per cent of the houses are equipped for gas heating, with a 5,880 degree day normal winter heating season.

In each of the company's sales divisions, domestic, house heating and industrial, a gold wrist watch, appropriately engraved, is awarded each month to the salesman having the highest volume of net gas merchandise sales in the month preceding, and the salesman's name is engraved inside the case. At the end of 1935 the man with the highest rating for the year will be awarded permanent possession of the watch.

Comstock Gets Montana Power Post

I. L. Comstock of the Portland (Ore.) Gas & Coke Co. was recently named assistant to J. C. Ryan, vice-president of Montana Power Co. in charge of new business development.

Again!

We, of the Detroit-Michigan Stove Company, have just enjoyed a preview of the 1936 Detroit Jewel and Garland Gas Ranges. If there exists, anywhere in industry, a line comparable to these superb new ranges, it is being produced on some planet other than this one.

Another thing! Business is headed for a healthy record through 1936. We believe the public will have the wherewithal to satisfy a very apparent, national inclination to quit repairing and start replacing.

Astute promotion behind quality products will find receptive markets ready to respond with rich rewards in record breaking sales.

We have great respect for the utility field's able recognition and response to such prospects. We also know that Detroit Jewel and Garland Gas Ranges will not only retain their undisputed past leadership in range sales records, but will play an even greater part in your achievements for 1936.

DETROIT-MICHIGAN STOVE CO.

Builders of

Detroit-Jewel Gas Ranges . . Garland Gas Ranges

DETROIT, MICHIGAN

Poster used in Gas Appliance Society's recent range campaign.

"New Style Gas Range Campaign" Is Live November Event for G. A. S.

By JEAN SCOTT FRICKELTON
Gas Appliance Society of California

FOR the first time in its history, the Gas Appliance Society of California has sponsored a Fall gas range campaign, the success of which has, no doubt, set a precedent for future years to come. Although it is too early to arrive at definite sales totals, reports and comments from leading retailers indicate that this pioneer Fall event, known as the "New Style Gas Range Campaign," was beyond the most optimistic anticipations, rivaling even the annual Spring Gas Range Week in results.

With the slogan, "Your range dates your kitchen—how does it look? How does it cook?" The campaign was held from November 2 to 16, inclusive, over the territory served with gas by the Pacific Gas and Electric Co. and the San Joaquin Light and Power Corp. The campaign was featured by a special offer to the public to save $5.00 on any range in the "Sticker Plan"* priced at $125 or more for the kitchen heater type, or $89.50 or more for the straight gas type of range. The special offer applied only to the following makes of ranges participating in the "Sticker Plan": Buck, Chambers, Detroit Star, Estate, Gaffers & Sattler, Magic Chef, Norge, Occidental, Spark, Tappan, Vestal, Wedgewood.

The Society's promotional campaign included one of the most extensive advertising programs which it has ever sponsored for an individual campaign, including newspaper advertising, slides in movie theaters, radio broadcasting, free mat service, envelope inserts and dealer display cards, a publicity clip sheet and a series of dealer bulletins.

The newspaper advertising in support of the campaign comprised one 48-inch advertisement (4-column by 12-inch) in 84 newspapers. This advertisement featured the special offer, as well as the slogan, and carried the trade names of the makes of ranges in the "Sticker Plan." The purpose of this advertisement was to provide newspapers with a key-piece around which to build up dealer tie-in advertising and publicity to focus the attention of the public on gas ranges in a compelling manner. As advertising of the special offer was prohibited prior to the afternoon of Friday, November 1, the newspaper schedule was made out on this basis, with the first ads appearing in the afternoon papers of that date in most localities. In towns having more than one newspaper on the schedule, the ad was staggered to give dealers a better opportunity to tie-in on more than one occasion during the campaign.

To aid newspapers in the preparation of special pages of tie-in advertising, a clip sheet was sent out containing a quantity of suitable publicity material, as well as photographs and illustrations for the use of papers in their news columns. Practically every newspaper on the schedule not only ran a generous amount of free publicity, but also ordered and used the Society's mats, with the result that thousands of inches of news, editorial and picture material served to throw the spotlight of public attention on gas ranges throughout the entire territory included in the campaign plan.

Movie slides, a new feature for Society campaigns, were utilized to distinct advantage, bringing the "Save $5.00" message visually before the patrons of 72 neighborhood theaters in approximately 50 towns. Gas range customers were also won by means of frequent and compelling radio announcements heard at least once every day over 11 stations located in key cities and towns of Northern and Central California. These announcements were of 1-minute duration, made in record form with interesting dialogue, followed by a brief comment on the special offer, as well as features which made the new range modern. Announcements were spotted at the time of day most popular with local listeners in each instance. Display cards for use of dealers were prepared and distributed. These cards in size 20 by 30 inch, with easel back, carried the "Save $5.00" message with the campaign slogan. Cards were cleverly constructed so that the special offer could be torn off at the conclusion of the campaign and the remainder of the card containing the slogan could be used for range, floor and window display indefinitely.

The special offer was printed on coupons resembling $5.00 bills. These were sold to dealers at a fraction of their cost, being imprinted, where desired, to serve as envelope stuffers or package inserts. Some 300,000 of these coupons were used. Mats of the coupon were provided to dealers to use in their tie-in advertising, and several hundred dealers availed themselves of this feature.

The gas range campaign plan was worked out by the following committee: Guy Farwell, Roy Stanforth, Eli Popovich, T. J. Clark, Jack Deggendorf, Edward Hinchey, Larry Quimby, Roland R. Deener, B. W. Reynolds.

B. W. Reynolds, as promotional director of the Society, was in charge of the execution of the program.

*The "Sticker Plan", perfected by the Gas Appliance Society of California, is a plan whereby the dealer, manufacturer (or distributor), and the utility, each contribute one-third of the price of a sticker placed on each gas range, cooker, or gas circulating heater sold. Funds from the sale of stickers are used exclusively for cooperative promotional advertising in the territory involved.

Johns-Manville Offers "Ticking Meter Plan" for Gas Heating Sales

JOHNS-MANVILLE Sales Corp. has prepared a portfolio for distribution to gas companies describing its new "Ticking Meter Sales Plan." It contains samples of four mailing pieces that are furnished to the gas company for mailing to gas heating prospects, and a booklet on house insulation that is taken to the prospect, in response to a reply card sent with the mailing piece, by the Johns-Manville salesman. The booklet treats of the superiority of gas heating as well as the merits of insulation. Each mailing piece may be signed either by the utility or by Johns-Manville, depending on how the individual company wishes to handle prospects.

The "Ticking Meter Sales Plan" offers a different approach to heating sales, lowering sales resistance on the issue of high heating costs, by tying in the economy resulting from proper house insulation, with gas heating.

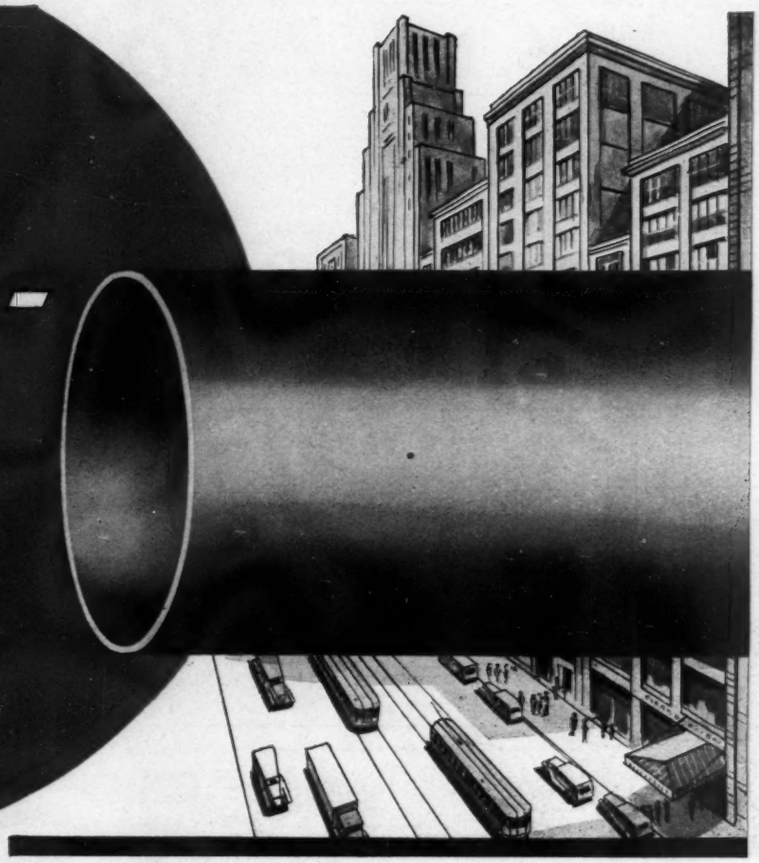
State of California Files Injunction Against Mountain View Gas Wastage

An injunction suit was filed in November by the California State Oil and Gas Division against a number of oil and gas operators in the Mountain View field to restrain unreasonable waste of natural gas. The action states that 37,000,000 cu. ft. are being wasted daily, and asks that the court limit daily production, prorated for each well, to 6,893,000 cu. ft. for the northwest section of the field and to 6,307,000 cu. ft. for the southeast section.

Simmons New Crane Co. Adv. Mgr.

Crane Co., Chicago, announces the appointment of H. H. Simmons as advertising manager, effective November 15. Mr. Simmons was formerly vice-president and account executive of Russell T. Gray, Inc., Chicago advertising agency. His first few years of business life were spent in the trade publication field.

Be SAFE- Rely on STEEL PIPE!



CHECK THESE ADVANTAGES

- ✓ *Reliability.*
- ✓ *Great tensile strength.*
- ✓ *A high degree of ductility.*
- ✓ *Adaptability for any type of joint.*
- ✓ *Less interruption to service.*
- ✓ *Lower laying costs.*
- ✓ *Longer lengths.*
- ✓ *Fewer joints.*
- ✓ *Various coatings available for bad soil conditions.*

The greatest asset in any pipe used for gas lines is reliability. This is the main reason why Gas Companies the country over continue to specify NATIONAL Steel Pipe; it is safe, efficient and economical, and can be relied upon to meet the most severe external or internal strains. Vibration (heavy street traffic), caveins, trench pressures, shocks, washouts, settling of filled ground and other factors place a heavy burden on underground lines, yet they are successfully met by the high tensile strength and ductility of NATIONAL Steel Pipe. Put in NATIONAL now and stop those excessive breaks, interruptions to service, loss of gas from defective joints, and high maintenance costs.

NATIONAL Steel Pipe for gas mains is made to rigid specifications by the largest manufacturer of steel tubular products in the world. When you specify NATIONAL, you obtain a product to which the most advanced design and methods have been applied by an organization with the widest experience in pipe problems. Check the list of advantages. Be safe, install NATIONAL Steel Pipe. NATIONAL engineers will gladly discuss with you any question that you may have concerning steel gas mains.

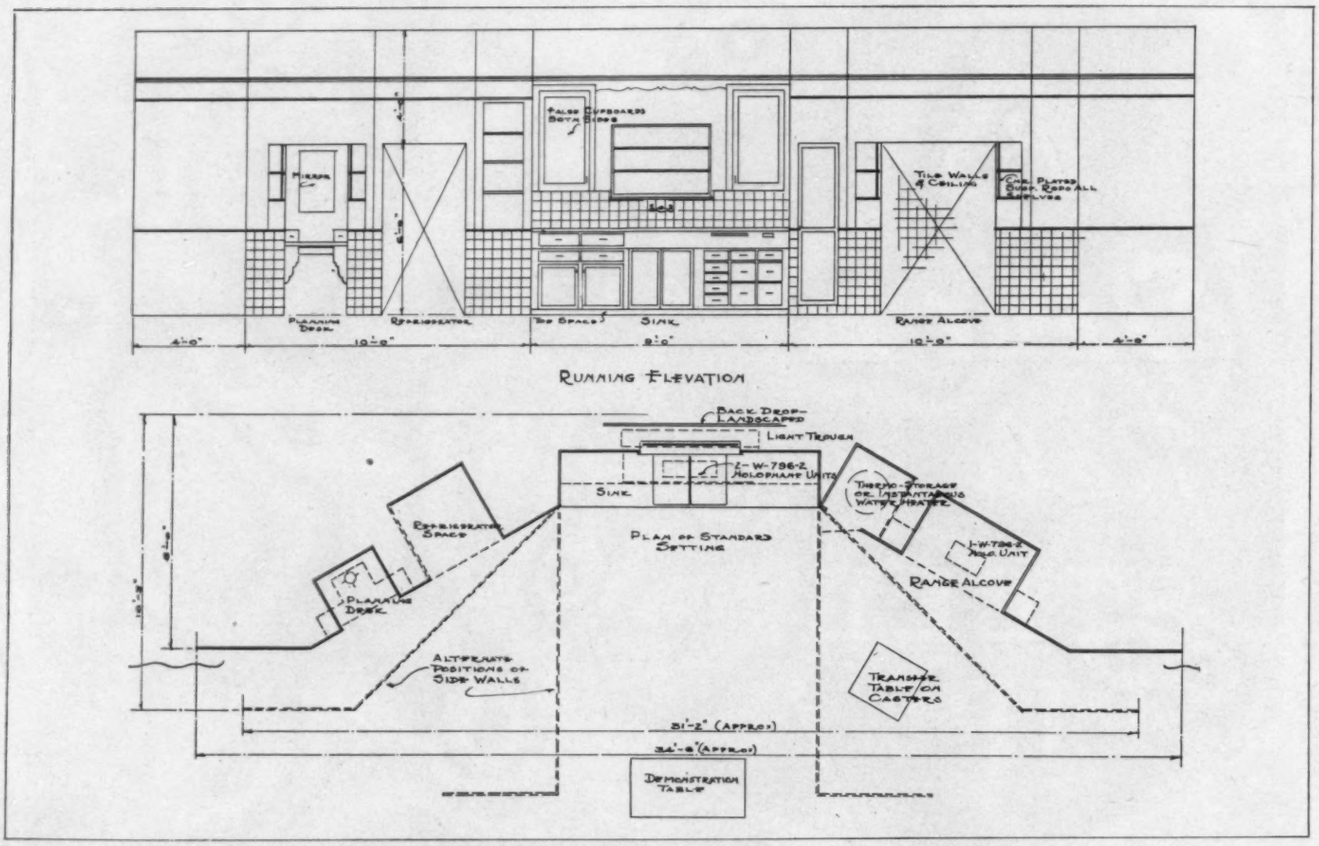
NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Pacific Coast Distributors—COLUMBIA STEEL CO., San Francisco, Calif.

Export Distributors—UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel Corporation Subsidiary

NATIONAL STEEL GAS MAINS



Plan and running elevation of L. A. G. and E.'s model kitchen stage set.

The Theatrical in Cooking School Backgrounds

(Continued from Page 23)

the use of border, side and footlights, coupled with the use of color wheels. In presentation, a little of the theatrical is employed. The theatre dinners are brought into play. Light intensity is gradually increased while color change is being effected. The result is the enhancing of color values—a deepening of painted and natural shadows. Invariably this play on the senses creates an opening interest which always brings forth "ohs and ahs" from the audience.

Most of us in the sales end of the utility business are beginning to realize the necessity for something dramatic or even spectacular in sales promotion. Any legitimate means of attracting attention to the service we have to offer should be employed. This kitchen set idea is probably only the beginning—anyway it is producing results.

The photographic reproduction on Page 23 shows the set as it is used in a theatre. The line drawing appearing above is sufficiently descriptive to indicate how the set is built. Any scenic company can build a similar set. Although the set as used by the Los Angeles Gas and Electric Corp. is partially a dummy it could just as well have been completely alive. The sink could be one of enamel or Monel and connected by means of flexible tubing to a drain; both hot and cold water faucets could very easily be connected by means of hose connections to the hot and cold water supply lines of the theatre.

This set, as it is designed and built, has met every requirement of the home economists. So successful and inexpensive was its use by Los Angeles Gas and Electric Corp. that now both Southern Counties Gas Co. and Southern California Gas Co. have similar cooking school equipment. It has been the means of faithfully presenting cooking schools in a natural environment with comparatively little invested capital.

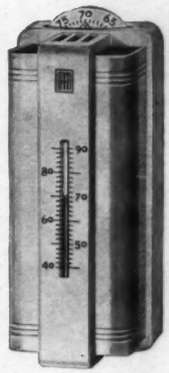
Milwaukee Companies Offer Gas Rates Fluctuating With Fuel Oil Market

GAS is being sold by the Milwaukee Gas Light Co. and its subsidiaries, the Lakeshore Gas Co., Wauwatosa Gas Co., West Allis Gas Co. and Wisconsin Eastern Gas Co., at rates fluctuating with the fuel oil market, in accordance with a plan recently devised by the company. The price of oil will be determined each month from the monthly average of daily public quotations published by the Standard Oil Co. of Indiana for No. 3 fuel oil delivered in Milwaukee County in 150-gallon lots to customers' premises. This scheme of prices applies to users of 10,000 cu. ft. per month or more, the user to be billed under this rate in the month following at not more than 55c nor less than 40c per M c.f. The 55c rate for quantities in excess of 10,000 cu. ft. is subject to a reduction of 1c per M c.f. for each two-tenths cent reduction in the price of No. 3 fuel oil below 10c per gallon.

The company also places gas house heating on a competitive basis with fuel oil by means of the following rates: First 400 cu. ft. per month, 50c; next 6,600 cu. ft., 75c per M c.f., and the next 3,000 cu. ft., 70c per M c.f. The new scale of rates provides a minimum monthly charge of 50c with a minimum annual charge of $100.

Lubbock, Texas, Sanctions Municipal Natural Gas System

The city of Lubbock, Texas, now served by the West Texas Gas Co., recently approved a $1,200,000 bond issue to finance a municipal natural gas distribution system. The municipal system will draw gas from the Hobbs Field, New Mexico, through a proposed 105-mile 8-inch transmission line. The city claims over 3,000 customers signed to be served by the system. Construction of the distribution system and transmission line is planned to start about the first of the year.



The **SERIES 10 CIRCUIT**

Used Exclusively in
Minneapolis-Honeywell Controls
Makes Possible their Flexibility
Durability and Accuracy

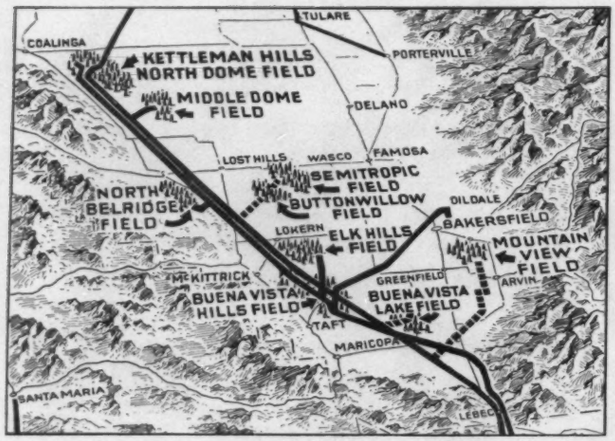
■

STANDARDIZE
on
MINNEAPOLIS HONEYWELL

ONLY Minneapolis-Honeywell can offer the true control performance made possible by the exclusive Series 10 Circuit. That is why it pays to standardize on this superior line of controls. Your Service Department can operate more efficiently and will have fewer calls, and your stock room will have to stock only one line when your gas heating installations are equipped with Minneapolis-Honeywell Controls. Minneapolis-Honeywell Regulator Company, 401 East Twenty-eight Street, Minneapolis, Minnesota.

Branch and distributing offices in all principal cities. In Canada: Minneapolis-Honeywell Regulator Co., Limited, 117 Peter Street, Toronto. European sales and service: 233 Heerengracht, Amsterdam, Holland.

MINNEAPOLIS-HONEYWELL
Control Systems
BROWN INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING



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This topographical map shows a part of the San Joaquin Valley gas transmission system, and a number of the principal fields from which gas is supplied to Southern California consumers. New extensions now building are indicated by the dotted lines.

▼

Progress on San Joaquin Valley Extensions

ADDITIONS to gas transmission and field gathering systems in the San Joaquin Valley, tying in new gas sources to main lines supplying Southern California consumption, are now in an advanced stage of construction. Shown on the map above, these extensions involve about a $750,000 expenditure, and will be completed in time to help meet winter peak demands.

Industrial Fuel Supply Co.'s 22-mile 10-inch line tying in the Mountain View field with Southern Fuel Co.'s 26-inch main transmission line near the Wheeler Ridge field is scheduled for completion by January 1. As a part of this project a new compressor plant is being installed to handle 10,000,000 feet of gas daily. There are 95 producing wells in the Mountain View area.

Southern California Gas Co. has several projects due for completion by December 15. A 6-mile 10-inch feeder from the new Buena Vista Lake dry gas field will tie in with the Southern Fuel Co. main transmission line near Buena Vista Hills. From the Semitropic-Buttonwillow gas field, Southern California Gas Co. is laying a 9½-mile 12- and 10-inch line to join its transmission line near the Belridge field. The same company's parallel line from Kettleman Hills fields to Fresno and Visalia via Lemoore, made up of 25 miles of 10-, 6-, and 8-inch pipe, will be finished the first week in December. To date 17 gas wells have been completed in the Semitropic area.

Circulating Heaters Stressed in No. Calif. Sales Drive

WITH the slogan "Turn on the Heat," the Gas Applaince Society of California launched its annual gas circulating heater campaign, November 23, to continue until December 7. Following on the heels of the signally successful Fall gas range campaign, described elsewhere in this issue, many of the features of the latter were incorporated in the heater campaign by the committee, including the use of the coupon resembling currency and containing the special offer.

The gas circulating heater campaign, like the range campaign, was limited to makes of circulating heaters in the "Sticker Plan." These follow: Allen, Fraser, Golden Glow, Gaffers & Sattler, Heatrola, Mission Maid, Payne, Occidental, Spark, Wedgewood.

Radio announcements, newspaper publicity, and two dealer bulletins were included in the program, as well as one of the most attractive display cards ever issued by the Society for the use of dealers in trimming up their windows and floors.

Newspaper advertising in support of the campaign is being handled by the Pacific Gas and Electric Co. with a complete newspaper coverage, the schedule providing for the insertion of two ads during the two weeks of the campaign in all cities and towns served with gas by the company. The two ads in the daily papers are 60 inch in size (4-column by 15 inch), while the two ads in the weekly papers are 24 inch (2-column by 12 inch).

As a special feature of the campaign the Pacific Gas and Electric Co. has volunteered to pay one-third of the cost of dealers' newspaper advertising dealing specifically with gas circulating heaters that are A.G.A. approved, providing the advertising is approved before running and is otherwise handled in accordance with the rules and procedure laid down by the company.

The "Turn on the Heat" campaign was built around a special offer of a saving of $2.50 on the purchase of a gas circulating heater in the "Sticker Plan" priced at $35 or more.

Teagarden New Dallas Utilities Examiner

Carl B. Teagarden, auditor and public accountant, has been selected by the Civil Service Board to the post of utilities examiner for Dallas, Texas, succeeding F. B. Sims who resigned recently.

Frank Bevan of P. G. and E. Dies November 8

THOMAS F. BEVAN, manager of displays for the Pacific Gas and Electric Co., passed away November 8.

Frank Bevan was born August 11, 1885, at Wheatland, Calif.

Following several years as a pharmacist, and later as a mortician and coroner, he entered the advertising business in 1925, opening his own agency. This endeavor brought him into contact with the Pacific Gas and Electric Co. He soon joined the company as commercial lighting salesman and after two years was selected to supervise the lighting sales program. His ability soon brought him the position of manager of displays, which he held until the time of his death. In this position he made a host of friends among gas men of the Pacific Coast.

He is survived by Mrs. Bevan and a son. According to H. M. Crawford, general sales manager for the P. G. and E., a testimonial will be presented to Mrs. Bevan by the sales department in tribute to Mr. Bevan.

W. C. Grant Elected Governor 10th District of A. F. A.

WILL C. GRANT, advertising director of the Lone Star System, headquartering in Dallas, Texas, was elected governor of the 10th District of the Advertising Federation of America at the District's annual convention held in Oklahoma City, November 1 and 2. Dallas has been selected as the site for next year's convention. The 10th District comprises organized advertising clubs in the Southwest.

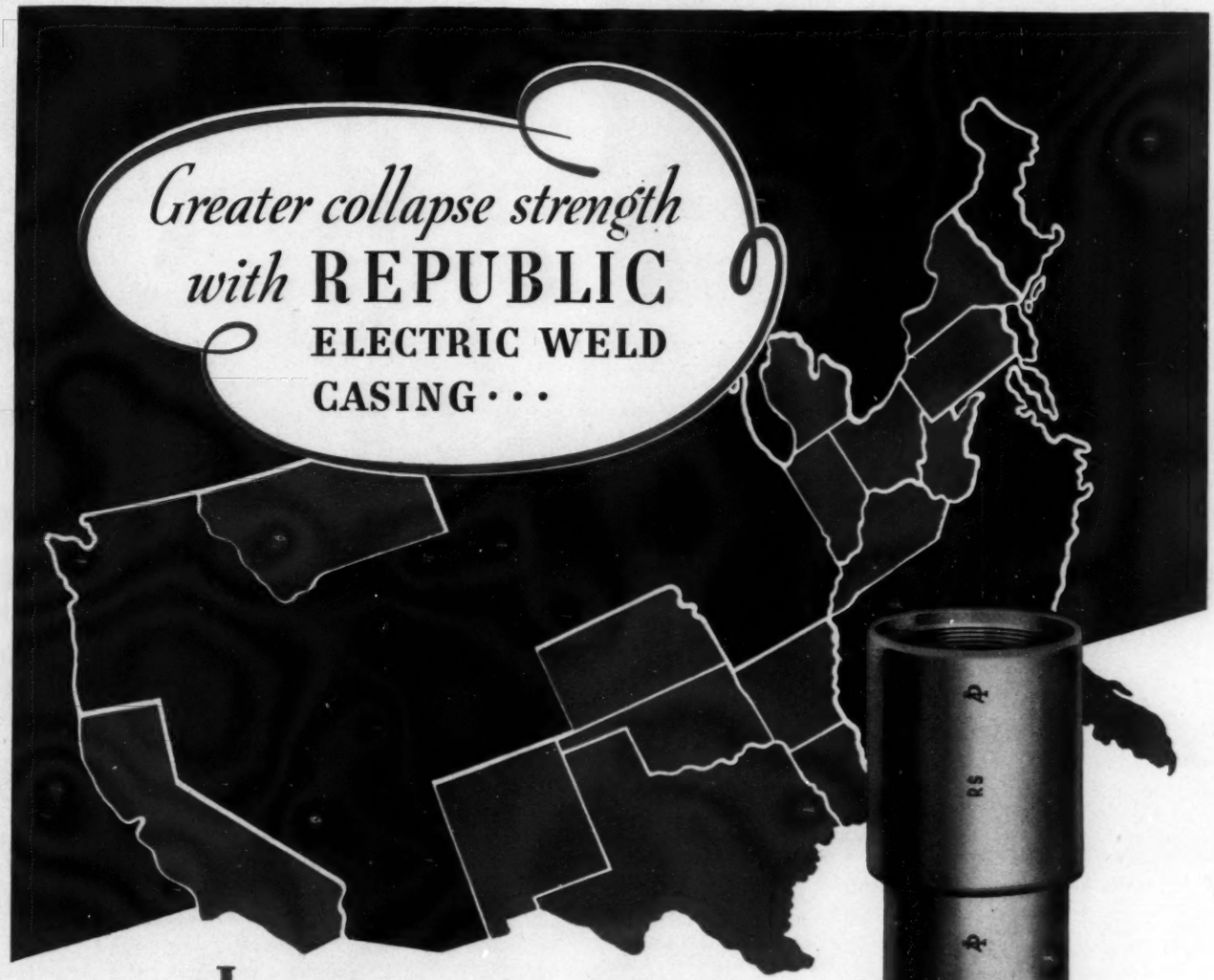
Mr. Grant is past president of the Dallas Advertising League and for the past 10 years has been active in advertising and newspaper circles in the Southwest. Prior to his joining the Lone Star Gas Co. in 1929, he was director of the Texas Public Service Information Bureau, leaving that office to organize the Lone Star advertising and public relations department.

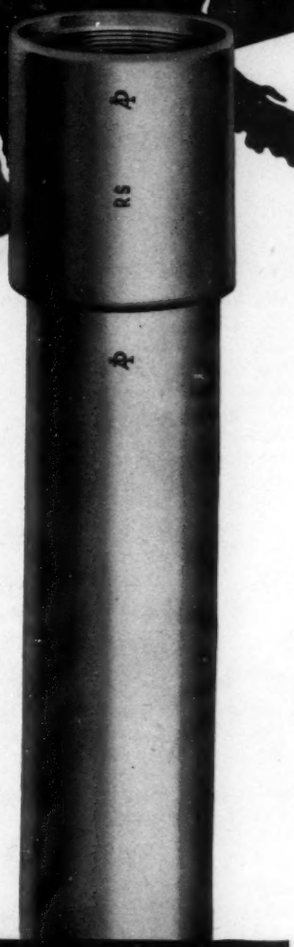
Western Gas Co. Laying 45-Mile Line to Arizona Smelter

WESTERN Gas Co., headquartering in El Paso, Texas, is working on a 6-inch 45-mile extension of its main pipe line to serve the Magma Copper Co. at Superior, Ariz., according to A. L. Forbes, Jr., general superintendent. The new line will tap the company's El Paso-Phoenix pipe line at a point near Casa Grande. The Magma Copper Co. change-over is the second smelter conversion to natural gas in Arizona, the first being the Phelps Dodge plant at Douglas about two years ago. While the smelter will constitute the principal load of the new line, it will also supply domestic consumers in the town of Superior.

Minneapolis Selected for Mid-West Convention

At a meeting of the Mid-West Gas Association's executive council, held in Ames, Iowa, November 8, it was decided that the Association's 31st annual convention would be held in Minneapolis, Minn., April 13-15, 1936. Hotel headquarters have not yet been determined.





IN a comparatively short time, more than twenty million feet of Republic Electric Weld Casing and Tubing has been shipped. Not a single joint has collapsed in the hole.

The high resistance to collapse of Republic Electric Weld Casing and Tubing is due to the "high yield point with high ductility" steel, the perfect roundness of the product and its uniform wall thickness.

Failures in casing are due either to collapse or casing pulling out of the coupling. Resistance to collapse and strength of joint are both dependent upon the yield point of the steel. Since Republic Electric Weld Casing and Tubing are made by a cold process, the yield point is much higher for the same tensile than in pipe made by hot processes.

Roundness and uniform wall thickness are vital factors in resistance to collapse, since a tube 1% out of round has about 25% lower resistance to collapse. These factors are also vital to joint strength, because they insure uniform thickness of metal under the roots of the threads.

Only in casing and tubing made by the cold process—only in casing and tubing made by the electric resistance welding method—is it possible to combine the factors that make possible such a high degree of safety and economy in use. Write for Handbook of Setting Depths and Bursting Pressures.

Republic Steel

CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO

REPUBLIC

HIGH YIELD POINT — ELECTRIC WELD — HIGH DUCTILITY

CASING • TUBING

House Heating Fundamentals: The Control System

(Continued from Page 22)

On this type of valve, it is important to see that the power element is not affected by heat from the main burner to the extent that it causes the burner to stay on.

The Automatic Pilot Light:

The pilot light provided on automatically controlled burners has two functions:

1. To light the burners when the gas valve opens.

2. To control the flow of gas to the burners in such a way that the pilot must be burning before the automatic gas valve can open.

This is accomplished by allowing the heat from the pilot flame to act on a bimetallic strip which, when affected by the heat, moves to close an electrical circuit or valve. If the circuit or valve is open, the burner cannot come on.

Its Location: The location of the automatic pilot light should naturally be such that the flame from it will readily ignite the air-gas mixture at the burner head.

Adjustment: It is obvious that in order to obtain the benefit of its safety features, the automatic pilot light should be adjusted to accomplish two things:

1. Allow the automatic gas valve to *open* within a short time after the pilot is lighted (usually from 2 to 10 minutes, depending upon the make).

2. Cause the automatic gas valve to *close completely* within a short time after the pilot goes out for any reason. (This is usually within 1 to 5 minutes, depending on the make of pilot and the temperature in the firebox when the pilot is tested.)

It sometimes happens that the pilot flame is so low that the cooling effect during a long "off" period of the burner causes the pilot to turn the burner off on false safety. Also, in some instances, the contact arrangement can be so close that vibration can cause the burner to go on and off.

Limit Controls:

Purpose: As the name implies, the function of a limit control is to close the automatic gas valve when temperature pressures or other conditions in the heating plant reach undesirable or unsafe limits of operation.

Types of Limit Controls and Use of Each: The limit control used depends, of course, upon the type of heating system in use. These types are:

1. Temperature Limit Controls: Used on warm air and hot water installations to limit the temperature of the water in the system or the air in the furnace.

Ordinarily, the setting of the hot water limit control is about 190° F. Set at this point it is primarily a limiting feature and does not necessarily add to any refinement of temperature control. It sometimes proves helpful, however, to prevent over-runs in room temperature on hot water installations, to set the limit control at a considerably lower temperature in mild weather; in this event, as the weather became colder, the indicator would, of course, be set higher.

On warm air installations, the limit control is usually set at 250° F. This, too, provides the limiting feature only and no refinement of temperature control.

One important point in connection with the operation of a limit control is the differential between "on" and "off."

The usual differential, under average conditions, for temperature limit controls is about 15° for surface hot water limit controls; about 5 to 10° for immersion hot water limit controls, and about 20° for warm air limit controls.

Some temperature limit controls are made for use with gas-actuated valves, in which case they are merely valves which control the gas supply in the control circuit of the diaphragm valve. When leaking, this type of limit control usually keeps the automatic gas valve closed.

2. Pressure Limit Controls: Used to shut off the main burners when the pressure in steam system reaches an undesirable limit of operation. These controls are mounted vertically in order for them to cut in and out at the pressure corresponding to the indicator setting.

3. Low Water Fuel Cut-Off: Used to shut off the gas in case of a low water condition while the burners are on, and to prevent the burners from coming on in case of a low water condition.

The piping arrangement to the boiler on low water cut-off installations is very important and if not carefully considered will cause unnecessary cutting on and off of the burners due to fluctuating water line in the column in which the float is located.

Dirty water in the boiler may cause surging, causing the low water cut-off to open and close the circuit to the valve in rapid succession. This results in unsatisfactory heating and may cause the burner to backfire.

The Low Limit Control:

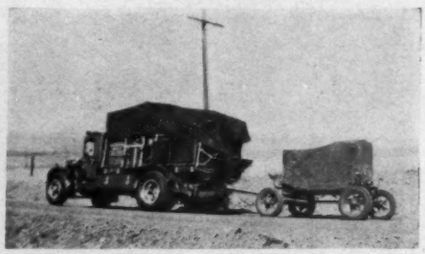
The low limit control is used to maintain a predetermined minimum system temperature when the thermostat fails to do so. It will be seen, therefore, that the low limit control may be calling for heat when the thermostat is not and that the burner will not shut off, in this case, by moving the thermostat indicator. For this reason, the low limit control setting should be only high enough to maintain circulating temperature. Over-heating results when the low limit control indicator is set too high.

It is also used where it is desired to cut the low limit control out of the circuit when the room temperature is 2° above the indicator setting. This prevents temperature overruns in mild weather.

It is obvious from the foregoing that the Control System acts as the "mind" of the gas heating system since it is the center or focus point of every operation performed by the entire system. In the designing of controls, manufacturers undoubtedly have recognized the importance of their coordinating features and have developed each one for certain definite situations or conditions. Haphazard selection of controls or a disregard of the relation each control bears to every other control or to the system as a whole, will very definitely defeat the purpose of the Control System as it relates to successful gas house heating.

Wilson Trailer-Mounted Gas Engine Driven Welder Completes Tour

THE truck-mounted gas engine driven 300-ampere arc welder of the Wilson Welder and Metals Co., Inc., North Bergen, N. J., recently completed a three-month jaunt during which it covered 10,000 miles



of travel east of the Rocky Mountains. The machine was demonstrated at 65 different welding and cutting shows conducted by the Air Reduction Sales Co. It is reported to have required no repair during the tour which took it over all kinds of roads, through all kinds of weather, and submitted it to all manner of current and operating conditions. The outfit is scheduled to appear in Airco demonstrations on the Pacific Coast.

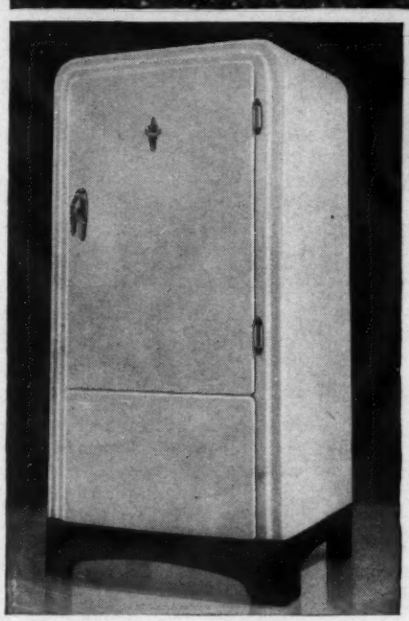
Gas Hair Dryer Tentative Requirements Formed

TENTATIVE approval requirements for gas hair dryers have been completed by the A. G. A. Subcommittee on Approval Requirements for Gas Hair Dryers, and have been distributed for comment to member companies. N. J. Reiff, of United Gas Improvement Co.'s appliance laboratory, is chairman of the subcommittee. The tentative gas hair dryer specifications call for automatic gas control in connection with the blower in addition to individual burner valves and a manual main control valve. Outlet air temperature is limited to 160° F. and the use of pressure regulators, thermostats and safety pilots is required. Limits are set for flue temperatures and for appliance surface temperatures under continuous operating conditions.

Western United Conducts Essay Contest for Employees

Western United Gas & Electric Co., Aurora, Ill., has announced an employee essay contest, the first prize award to be a trip—to a major convention, to Washington, D. C., Boulder Dam, Tennessee Valley or to some other point of interest. Second prize in the contest is $50, third $25, fourth $20, fifth $15, sixth $10, with five prizes of $5 each. All employees, department heads and officers are eligible to participate in the contest, which closes December 2.

ELECTROLUX IS THE OVERWHELMING FAVORITE AT NEW HAVEN



GAS REFRIGERATION goes into 1936 a favorite by big odds in New Haven. During the past ten months, New Haven gas men have carried Electrolux to sales leadership . . . outselling by far the nearest competitive make of automatic refrigeration. And that's *real* achievement in this home of the Elis, where battles are always hotly contested.

Results in the recent A. G. A. Prosperity Cup Contest also indicate the kind of mettle these New England gas men are made of! They came out *on top* for total installations per 10,000 meters in Division B.

Writes P. J. Naschold, sales manager of New Haven Gas Light Co.: "Our salesmen and salesladies entered into the spirit of this contest with vigor and enthusiasm. No special inducements were made to them, as they were eager to make a good showing and realized that with the stimulus of this splendid campaign more sales could be made, with resultant extra earnings. The effort which they put forth is attested to by the fact that they won five of the final individual awards in Division B, including first and second place.

Displays Produce Sales

"We advertised liberally in our local papers and bent every effort to secure sales under our regular merchandising plan rather than by deep cut inducements. Displays of Electrolux were made in several of our dealers' shops. The home service department held demonstrations in cooperation with some of the known hardware stores. Our display at the Better Homes and Gardens show alone resulted in 140 direct sales."

Plan now for 1936

Throughout the coming year, gas refrigeration offers every gas company an unparalleled opportunity to increase the gas load, increase their sales people's earnings, increase the satisfaction and good will of customers with gas. Every Electrolux installed publicizes the modernity of gas as fuel . . . gives a strong impetus to the sale of other gas-using appliances.

Right now, plan to make gas refrigeration the spearhead of your 1936 merchandising and sales program. Take advantage of the ever-mounting popularity of gas refrigeration to win new successes for your company. Servel, Inc., Electrolux Refrigerator Sales Division, Evansville, Indiana.

NEW *Air-Cooled*
ELECTROLUX
THE SERVEL *Gas* REFRIGERATOR

THESE ADVERTISERS

selected WESTERN GAS for Gas Industry Coverage during 1935:

The American Brass Company
American Cast Iron Pipe Co.
American Gas Association
American Gas Products Co.
American Meter Company
American Recording Chart Co.
American Stove Co.
Art Concrete Works
The Barber Gas Burner Co.
Barco Manufacturing Company
Barrett Company
H. R. Basford Company
Blaw-Knox Company
G. S. Blodgett Company
The Bristol Company
The Bryant Heater Co.
Byllesby Engineering & Management Corp.
The Cast Iron Pipe Reserach Assn.
The Chaplin-Fulton Mfg. Company
The Cleveland Cooperative Stove Co.
Coast Counties Gas & Electric Co.
Connelly Iron Sponge & Governor Co.
The Cooper-Bessemer Corporation
Daniel Orifice Fitting Co.
Dearborn Chemical Company
Denver Fire Clay Company
Detroit-Michigan Stove Co.
Edward A. Dieterle
S. R. Dresser Manufacturing Co.
Electrogas Furnace & Mfg. Co.
Electrolux Refrigerator Sales, Inc.
Ensign Carburetor Company, Ltd.
Estate Stove Company
Fluor Corporation, Ltd.
Foxboro Company
Fraser Furnace Company
Fredell Construction Co.
General Ceramics Company
James Graham Manufacturing Co.
Greenlee Tool Co.
Hurja-Johnson-Huwen, Incorporated
Hydrauger Corporation
Inland Manufacturing Company
Johns-Manville Co.
Johnson Gas Appliance Co.
Jones & Laughlin Steel Corp.
Kerotest Mfg. Co.
Los Angeles Gas & Electric Co.
Linde Air Products Co.
Memphis Natural Gas Co.
Memphis Power & Light Co.
Merco Nordstrom Valve Co.
Minneapolis-Honeywell Regulator Co.
Mueller Co.
L. J. Mueller Furnace Co.
The National-Superior Co.
National Tube Company
Natural Gas Equipment, Inc.
Nemec Combustion Engineers
Non-Corrosive Products Co.
Pacific Coast Gas Association, Inc.
Pacific Gas and Electric Company
Pacific Gas Radiator Company
Payne Furnace & Supply Co.
Peerless Manufacturing Corporation
Penn Electric Switch Co.
Pittsburgh Equitable Meter Co.
Pittsburgh Water Heater Co.
Porcelain Enamel Institute, Inc.
Pressed Steel Tank Company
Reliance Regulator Corp.
Republic Steel Corporation
Reynolds Gas Regulator Co.
Robertshaw Thermostat Company
Roberts-Gordon Co.
Robinson Orifice Fitting Co.
Geo. D. Roper Corporation
Safety Gas Main Stopper Co.
San Diego Consolidated Gas & Elec. Co.
M. B. Skinner Company
Smith-Emery Company
Spencer Thermostat Company
The Sprague Meter Company
Surface Combustion Corp.
Tanner Tank Company
The Texacone Company
United Engineers & Constructors, Inc.
United States Pipe and Foundry Co.
Utility Development Co.
Ward Heater Co., Ltd.
Webster Engineering Co.
Welsbach Company
Wilcolator Company
Worthington Pump & Machinery Co.
John Zink Company

THERE IS NO SUBSTITUTE FOR CIRCULATION!

WESTERN GAS
MEMBER—ABC, ABP

810 South Spring St. . . . . Los Angeles
1064 Peoples Gas Bldg. . . . . Chicago

Odorization of Gas

(Continued from Page 12)

temperature, the temperature changes in the gas mains occur so slowly that when this unit is properly heat-insulated, it requires attention not oftener than once a month.

Charts are provided with this equipment giving definite means for determining precision valve settings required for a given degree of odorization, and given line pressure and a given orifice plate size in the line.

Cost

The total cost of odorizing in the average property, allowing a normal charge for depreciation, maintenance, operation, etc., should not be much over 1/10 of a cent per thousand cubic feet of gas. In larger properties, it should be less than this amount. The value of gas at city gates is usually not less than 15c per thousand. The cost of odorization then becomes 0.67 per cent of the value of the gas. Odorization should certainly account for more than a 1 per cent reduction in unaccounted-for gas, which alone pays for odorization. As a safety factor, odorization cannot be evaluated in cold figures, but everyone who odorizes has been thankful on more than one occasion for odorization locating hidden hazardous leaks. Just one bad fire or explosion costs more than years of odorization.

Pentalarm

Fig. 6 and Table No. 1 show the vapor pressure and some of the chemical and physical properties of Pentalarm.

Pentalarm is essentially amyl mercaptan, which as pointed out previously, was rated very highly by the Bureau of Mines in the work done jointly with the American Gas Association.

Pentalarm is a material which is intentionally and especially prepared for odorization work. It is an almost chemically pure compound, and as can be seen from its distillation range, it can be used very satisfactorily in either a drip type or an absorption type odorizing unit. It is free of light low boiling fractions of extremely high vapor pressure and is also free of high boiling, slow evaporating, non-volatile tails.

The table of saturation limits shows that Pentalarm can be used very satisfactorily in gas under any commercial working pressure. The purity, narrow boiling range, and uniform evaporation of the product make it ideal for use in the absorption type of odorizing equipment.

TABLE NO. 1. PENTALARM DATA

Boiling Range	230°F. to 302°F.
Specific Gravity—liquid	0.835 at 68°F.
Specific Gravity—saturated vapor	3.58 at 32°F.
Heat of Vaporization—approximate	144 B.t.u. per pound
Flash Point	47°F.

Pounds Pentalarm Present per Million Cubic Feet at Saturation Limits of Pentalarm in Natural Gas.*

	30 Lbs. Gauge Pressure	100 Lbs. Gauge Pressure	400 Lbs Gauge Pressure
°F.	(Lbs.)	(Lbs.)	(Lbs.)
0	751	291	81
32	1,566	610	169
40	1,880	734	203
68	3,625	1,415	392
86	5,500	2,148	595
104	8,180	3,200	884

*Calculated on the basis of gas of gravity 0.62.

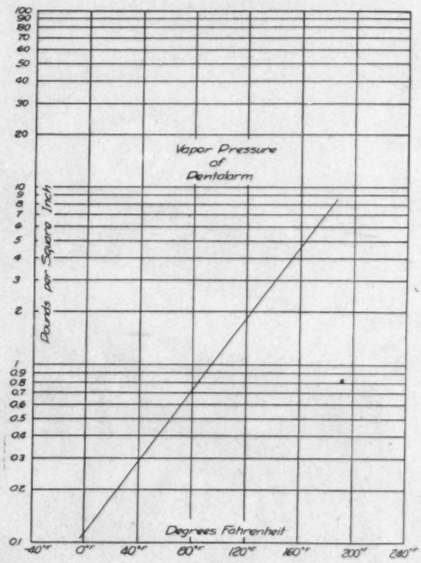


FIG. 6.

San Joaquin Light & Power Corp. Gas Heating Campaign

San Joaquin Light & Power Corp., headquartering in Fresno, Calif., began its Fall heating campaign September 1, to run until December 31. Newspaper and billboard advertising and a "Natural Gas Appliance Show" are used in the campaign. Dealer tie-in advertisements in the newspapers are carried over the name "Your Gas Appliance Dealer." F. H. A. terms are offered in the drive.

Quotas expressed in M c.f. have been set for each salesman, with a $10 monthly bonus going to the salesman selling the highest percentage of his quota during the month. Prizes of $25, $15 and $10 will be paid to the three salesmen ranking highest for the whole campaign.

Port Lavaca to Have Natural Gas

Texas Natural Gas Utilities, headquartering in Houston, has obtained a franchise to serve natural gas in Port Lavaca from a new gas field near the town. Construction of the distribution system was to have been started last month.

R. H. Gardner Transferred to Pittsburgh

R. H. Gardner, formerly division manager of the A. M. Byers Co. Washington office, has been transferred to Pittsburgh as manager of steel pipe sales, according to M. J. Czarniecki, vice-president.

JANITROL

An established name

For a complete line . . .

JANITROL

● **The popular name, JANITROL, for several years synonymous with the leading make of conversion burner is now being applied to the most complete of all lines of gas space-heating equipment. . . . JANITROL public acceptance has long been reflected in goodwill from present users. This goodwill and the association of this worthy name with efficient and dependable performance will in turn be reflected in easier sales for the gas utilities.**

FOR A DIVERSIFIED MARKET . . . .

. . . a complete line of

ANY SPACE

equipment for

HEATING REQUIREMENT

Some of JANITROL Products were shown in the October 26th advertisement in this publication, reproduced here.

Surface Combustion Corporation

Toledo, Ohio · *Sales and Engineering Offices in Principal Cities*

8

Outstanding FEATURES

1. Stream - lined valve mechanism insures maximum capacity with minimum friction.

•

2. Self-centering valve operating on a ball socket joint.

•

3. Removable valve seat takes shock of expansion and turbulence.

•

4. Oilite bearings used at all bearing points.

•

5. Larger capacities obtainable through Type P Regulators.

•

6. Alemite fittings provide for packing box gland lubrication while Regulator is in operation.

•

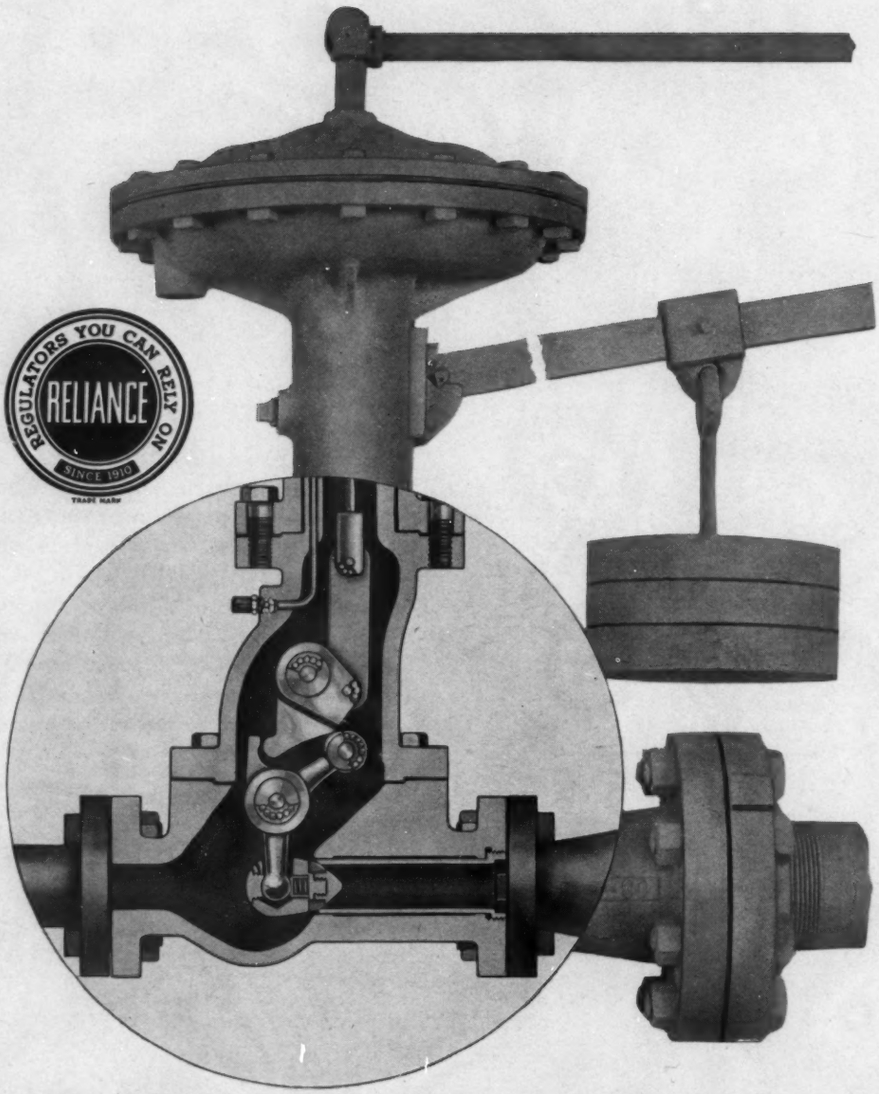
7. Eccentric cam bearing shaft may be adjusted from outside of Regulator.

•

8. Lever weighted Type P Regulators may be readily changed to pilot controlled types.

•

Write for Bulletin No. 32



Type "P" High Pressure Regulator

This Type "P" Reliance High Pressure Regulator is skillfully designed and built to the highest standard of mechanical accuracy, insuring reliable operation in industrial and district lines. Oilite bearings are used throughout and are self-lubricating, minimizing friction and permitting instant adjustment to varying conditions.

Made only in 1" and 2" sizes, and available for pressures up to 500 pounds. Specify "Reliance" and get the benefits of this new principle of design resulting from our many years of experience.

Write for Bulletins 32, 34, 36 and 37.

Reliance Regulator Corp.

1000 Meridian Ave.
Alhambra, California

RELIANCE REGULATORS

MEASUREMENT and CONTROL

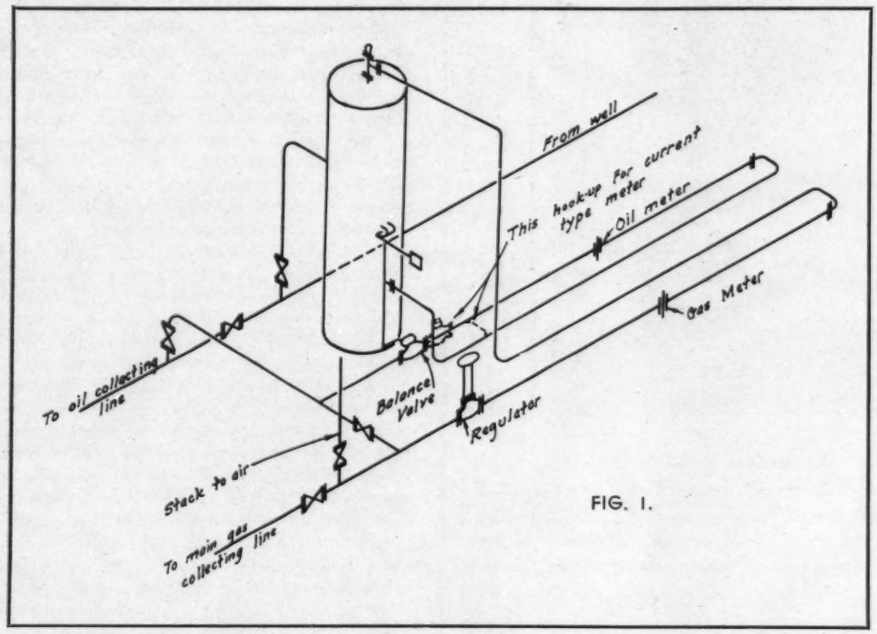


FIG. 1.

A Method for the Measurement of Crude Oil Having Gas in Solution

By E. W. McALLISTER

Kettleman North Dome Association
Production Department*

THE measurement of crude oil having gas in solution was first contemplated as a means of determining a well's production without the use of individual flow tanks, thus allowing the production of several wells to be transported through a common flow line to a centrally located joint trap and tank setting. This arrangement effects a saving in labor, eliminates the necessity of installing flow tanks, multistage trap settings, and the extension of two or three wet gas collecting lines to each well.

The meter is installed in such a manner as to minimize the possibility of any free gas being carried with the oil through the meter. This is done in the following manner: (See Fig. 1) The balanced valve ordinarily connected to the oil discharge outlet of the gas trap is removed and the oil meter connected directly to the outlet by a short length of pipe. Another length of pipe connected to the downstream side of the meter leads back under the trap float arm and the balanced valve is installed at this point. The operating lever of the balanced valve is connected to the float lever of the trap controlling the fluid level in the trap. This arrangement maintains the trap operating pressure on the oil until it has been metered and passed throught the balanced valve, preventing any gas from coming out of solution during the metering. The oil after leaving the meter trap setting is transported by the common oil connecting lines to a joint trap and tank setting where it goes through the lower pressure stages of separation and is collected finally in the tanks.

The gas after leaving the trap is metered (Fig. 1) and then collected in the main gas lines. A regulator at the downstream end of the gas meter run controls the meter trap pressure. In the case of a well flowing at pressures too low to meet the pressure of the main gas lines, the gas can be by-passed into the oil collecting line (Fig. 1) and separated at the next lower stage at the joint trap and tank setting. In this event the regulator need only be set to hold a meter trap pressure slightly higher than that of the oil collecting line.

At present the current type meter and the orifice meter are used for metering the oil. If the orifice meter is used it is connected up in the usual manner using water seals. Both types of meter require a correction factor which has been termed the "Shrinkage Factor." The "Shrinkage Factor" is the correction applied to the volume of the oil as registered by the meter to correct for the oil's increase in volume due to the gas in solution. It is determined empirically in the following manner: A sample bomb containing a thermometer well and bleeder valves at the top and bottom is connected to the oil line near the oil meter. Oil from the line is then allowed to bleed through the bomb until the bomb temperature has approached that of the line. By insulating the bomb, its temperature can be brought within two degrees of the line temperature. The two bleeder valves are then closed, trapping a sample of oil at the metering temperature and pressure. This sample is bled into a graduated glass cylinder allowing the gas to escape. The remaining oil volume is determined and the temperature and gravity are taken. Using temperature correction tables the volume of the oil sample at line temperature can be calculated. The ratio of this volume to that of the bomb, which has been determined previously, gives the "Shrinkage Factor."

The curve shown in Fig. 2 is plotted from the data of nearly 100 tests made using oil of 35 to 40° A. P. I. gravity and temperatures varying from 80 to 150° F.

Other factors necessary to be determined for calculation of the orifice meter coefficient but not necessary with the other type of meter are the specific gravity of the oil with gas in solution and the specific gravity of water with gas in solution.

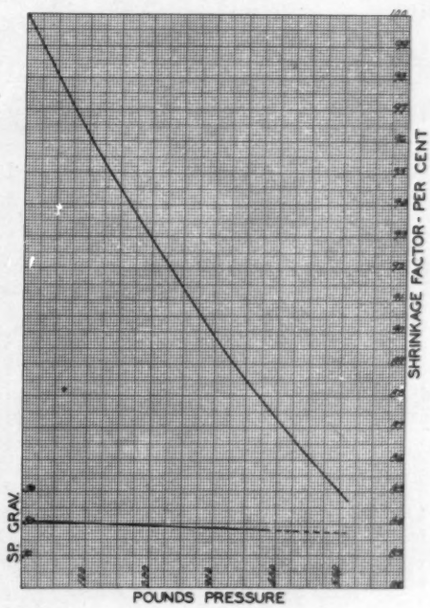
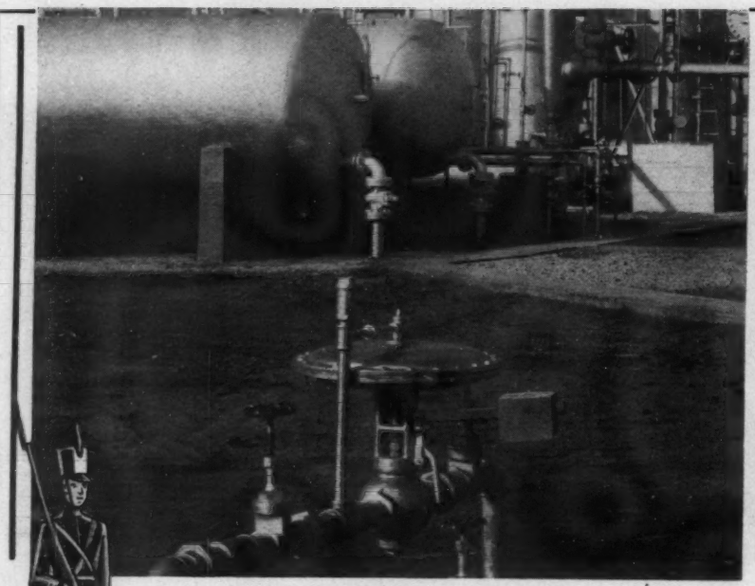


FIG. 2.

The specific gravity of oil with gas in solution is determined as follows: A bomb sample of oil is obtained as described previously. This sample is taken to the laboratory and is connected to equipment for col-

*Presented before the Southern California Meter Association, October 24, 1935.

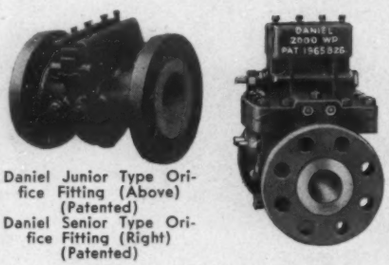


ON GUARD!

A line carrying natural gas from the field to a large oil-company plant delivers the gas at an even pressure, in all weathers and at all seasons, because Fulton Regulators are on guard. Nothing unusual! Our illustration is like the picture of a sentry on guard, doing methodically what he has been trained to do well. Fulton Regulators have been serving all the requirements of pressure control, in the gas industry and elsewhere, for fifty years.

THE CHAPLIN-FULTON MFG. CO.

28-40 Penn Avenue Pittsburgh, Pa.



Daniel Junior Type Orifice Fitting (Above) (Patented)
Daniel Senior Type Orifice Fitting (Right) (Patented)

DANIEL ORIFICE FITTINGS Meet All New A.G.A. Requirements

The Industry's endorsement of DANIEL Orifice Fittings is based upon tested and proved performance under the most severe conditions. Repeat orders, in growing numbers, from satisfied DANIEL users are convincing proof of the fact that it **pays to standardize** on DANIEL Orifice Fittings. Write for prices, specifications and technical data.

DANIEL ORIFICE FITTING COMPANY
2719 Elm St. Phone CA 9228 Los Angeles, Calif.

Connelly Back Pressure Valve

Connelly Back Pressure Valves Backed by Sixty Years Service to Gas Industry

Choose the CONNELLY valve to prevent reverse flow in your gas lines. The CONNELLY insures safety on industrial burners using boosted air pressure. The check disc is light weight to provide low differential. Special discs are used on heavy duty. Line pressure 125 pound maximum for standard valve. Higher pressures special. Cover plate gives access for inspection and cleaning.

CONNELLY PRODUCTS INCLUDE

Caloroptic BTU Indicator; Governors; Valves; Regulators; Gauges; Gas Purifying Materials, etc.

Connelly Iron Sponge & Governor Co.

Chicago, Ill., 3154 South California Ave.
Elizabeth, N. J., 200 South Second St.
AGENTS
Theo. H. Piser, 155 Moffat Rd., Wayban, Mass.
Parsons Engr. Co., 525 Market St., San Francisco

lecting the gas as it is bled from the oil sample. The volume and gravity of the remaining oil and collected gas are determined and the weight in grams of each calculated. The sum of these two weights divided by the volume of the bomb in c. c. gives the specific gravity of the original sample of the oil with gas in solution.

The results of test made with oil from one meter trap setting are plotted in Fig. 2.

The specific gravity of water with gas in solution is necessary because of the use of water seals with the orifice meters. At present no satisfactory method has been developed to determine this factor. However, this factor will be a minor correction apparently since the gravity of the oil with gas in solution was changed very little.

In general the meters register from 2 to 3 per cent under the oil received in each joint tank setting. This error is prorated back daily to each well in the respective groups.

The orifice meter is a more expensive installation than the current type meter and it requires more attention after it is in operation. However, it has the advantage of making it easier to set a well on a desired rate and it has no error due to rate of flow. The current type meter has an error due to rate of flow and its efficient metering range is not great enough for the varying rates of production. Some trouble has been encountered with emulsion stopping up the orifice meter lines from the meter run to the meter. This has only happened at one or two wells and at very low rates of flow.

S.C.M.A. Conducts Its 7th Exhibitors' Night

SOUTHERN California Meter Association held its seventh annual Exhibitors' Night November 21 in the auditorium of the Los Angeles Gas and Electric Corp. The exhibit opened at four o'clock and was followed by a banquet and the regular business meeting.

George H. Christen of the Pacific Meter Works of the American Meter Co., who is chairman of the Association's entertainment committee, was in charge of the committee on exhibits, with Paul P. Daniel of Daniel Orifice Fitting Co., acting as sub-chairman. Other members of the committee were Frank Burt, General Petroleum Corp.; H. A. Cowan, Union Oil Co.; D. W. Darnell, Fluor Corp.; Bernie Devine, Southern Counties Gas Co., and Gordon Greene, Robinson Orifice Fitting Co.

Manufacturers and distributors of measurement and control equipment participating in the exhibit were the following: American Meter Co.; Braun Corp.; Bristol Co.; Commercial Iron Works of Los Angeles; Daniel Orifice Fitting Co.; Foxboro Co.; Natural Gas Equipment, Inc.; Permutit Co.; Pittsburgh Equitable Meter Co.; Reliance Regulator Corp.; Robinson Orifice Fitting Co.; Taylor Instrument Co., and Tunnell, Wood & Neilan, Inc.

After the banquet, the meeting was opened by President F. E. Bradley who called upon F. A. Christanelli of the General Petroleum Corp. for a concertina solo and several songs. The meeting was then turned over to D. M. Hill of the Foxboro Co., program

chairman, who introduced the speaker of the evening, F. G. Philo, superintendent of fuel-electric stations for Southern California Edison Co. Mr. Philo presented an excellent paper on "Heat Accounting with Power Plant Instruments," illustrating it with slides. His paper will be published in full in the January issue of *Western Gas*.

The next meeting of the S. C. M. A. will be held December 18 in the Los Angeles Gas and Electric Corp. auditorium and will be an open house for the wives and friends of members. The principal feature of the program will be the showing of a motion picture film taken by G. L. Hancock, of Hancock Oil Co. of California, on an expedition to the Galapagos Islands.

Committee Named for Short Course at Norman

THE General Committee in charge of the Southwestern Gas Measurement Short Course, held each Spring at the University of Oklahoma, at Norman, Okla., held its first meeting November 25, in Oklahoma City, and organized for the 1936 Short Course. Dates for the Course, which covers three days, will be decided at a meeting early in January.

The Committee as organized at the November 25 meeting includes the following: R. D. Turner, Skelly Oil Co., Tulsa, chairman of General Committee; Professor W. H. Carson, University of Oklahoma, chairman Banquet, Entertainment and Local Arrangements Committee; E. E. Stovall, Lone Star Gas Co., Dallas, Texas, chairman of Program Committee; Gilbert Estill, Oklahoma Natural Gas Co., Tulsa, chairman of Exhibits Committee; Max Watson, Canadian River Gas Co., Amarillo, Texas, vice-chairman, Exhibits Committee; Ray Roundtree, United Gas Co., Houston, Texas., chairman of Committee for Study of Practical Methods; Max Watson, chairman Publications Committee and G. W. McCullough, Phillips Petroleum Co., Bartlesville, vice-chairman Publications Committee.

R. D. Hanley, Magnolia Petroleum Co., Tulsa, was elected to membership on the General Committee, which in addition to the foregoing, includes the following: Paul Stockwell, gas and electric engineer, Corporation Commission, Oklahoma City; A. E. Higgins, secretary of Natural Gas Department, American Gas Association, Dallas, Texas; Wm. F. Lowe, secretary of Natural Gasoline Association of America, Tulsa; W. R. McLaughlin, Pittsburgh Equitable Meter Co., Tulsa, (General Chairman, 1934); G. P. Bunn, Phillips Petroleum Co., Bartlesville; J. H. Satterwhite, American Meter Co., Tulsa; G. B. Lane, Foxboro Co., Dallas, Texas; L. G. Rheinberger, Sinclair Oil & Gas Co., Tulsa; V. C. Jarboe, Empire Companies, Bartlesville, Fay C. Walters, Panhandle Eastern Pipe Line Co., Kansas City, Mo.; Earl Kightlinger, Arkansas Natural Gas Corp., Shreveport, La.

Former chairmen of the General Committee, now ex-officio members, are D. C. Williams, Kay County Gas Co., Ponca City; John H. Baxter, Inland Gas Co., Ashland, Ky.; E. A. Clark, Columbia Gas and Electric Co., Pittsburgh, Pa.; F. D. Franks, Cities Service Gas Co., Bartlesville; D. A. Sillers, Lone Star Gas Co., Dallas, Texas; C. B. Day, Consolidated Gas Utilities Co., Blackwell; and B. L. Maulsby, Oklahoma Natural Gas Co., Tulsa.

The 1935 Short Course held in April had a registration of 575, representing 22 states and three foreign countries.

Pressure Piping Code Published

The American standard code for pressure piping is now available from the American Standards Association, and is designated as "American Tentative Standard Code for Pressure Piping" B 31.1—1935. Drafting of the code was sponsored by the American Society of Mechanical Engineers. It contains standards requirements for power, gas and air, oil and district heating piping systems and specifications of fabrication details and materials.

H. W. Drake Leaves Portland Gas & Coke Service

H. W. Drake, superintendent of the garage bureau for Portland (Ore.) Gas & Coke Co., has joined the A. F. Blangy Motor Co., Seattle, Wash., Ford distributor, as engineer. Mr. Drake was recently elected national vice-president in charge of transportation and maintenance activities of the Society of Automotive Engineers.

D. B. Larson, distribution bureau superintendent, will have direction of the garage bureau.

The Greenlee Hydraulic Pipe Pusher is self-contained. It operates on a standard rail (furnished in various lengths) having milled notches. When the pipe has been pushed forward 4 inches, a pawl on the body of the pusher drops into a notch to hold it while the oil pressure in the cylinders is released by depressing the levers. Springs within the body then bring the pistons forward to a new notch for their pawl, and the operation is repeated until the end of the rail is reached. At this point the machine is pulled back to the opposite end and the pipe clamp is reset.

One man, standing in a comfortable position, can exert a pressure of 40,000 pounds on the pipe clamp. Eight operating speeds are available for varying soil conditions, and it is possible to make a push of from 4 to 7 feet with but one setting of the pipe clamp.

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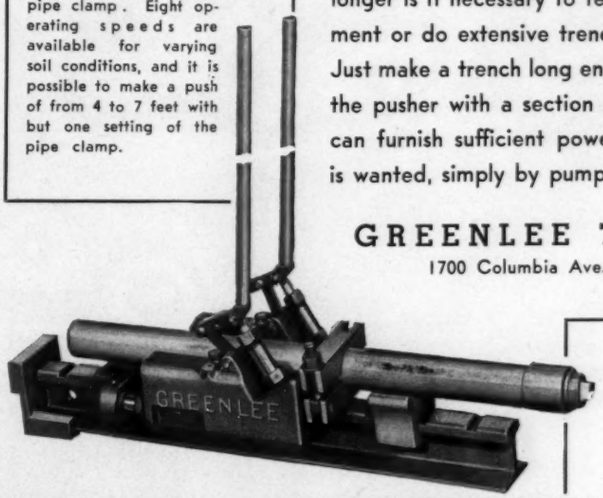

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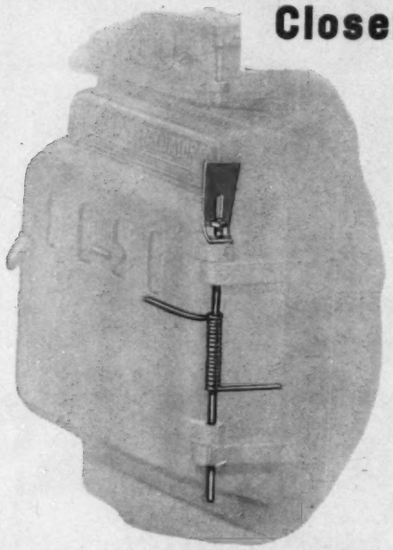

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House Heating Service Job Training

(Continued from Page 24)

These groups of 16 men meet once a week for one hour at their own shop, and under the direction of a representative of the centralized training division, are offered a course consisting of:

1. An analysis of the job of house heating service man.
2. The organization of the knowledge and skill required of a house heating service man into best order for teaching.
3. A study of teaching methods.
4. An opportunity for each member of the class to do some teaching or instructing, under supervision.

The whole course is definitely on a discussion basis and no lectures are given.

Recognizing that one of the duties of every supervisor is the instruction of the men under him, a group of supervisors in each shop has been organized and are taking the same course as described above.

Also, the three district shop foremen, the three assistant foremen, and the three district service supervisors are meeting in one group and taking the same course.

These seven classes are the only ones that have been organized as yet, and it is difficult to predict just how the training program will develop. But already much valuable material is being uncovered in the analysis of customer relations. It is surprising how differently two supposedly competent house heating service men react in their customer contacts. One man is careful to practice such seemingly unimportant acts as stepping back from the door after knocking, and calling the customer by name when he addresses her. Another service man will contend that it isn't necessary to be polite to the customer as she is glad to see him anyway, and the only thing that is necessary is to perform the requested service and get out.

Probably one of the next steps will be the assembly of the results of the analysis of house heating contacts into a manual on customer relations for house heating service men. In the preparation of such a manual a centralized training division should be able to render valuable service, but it is questionable whether the manual should appear as a publication of the training division. Certainly it is desirable to publish in every manual a statement similar to the following: "This manual is the result of a series of conferences with selected groups of experienced house heating service men." It might even be well to print the names of those who were members of these conferences.

As the analysis of the job of house heating service man develops it may become evident that certain material is suitable for group or classroom instruction. The centralized training department should be able to help in organizing such material, but the actual job training to be carried on should be left to the Distribution Department.

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Mo. Power & Light Co. Constructing Raytown-Liberty 24-Mile Line

MISSOURI Power & Light Co., headquartering in Jefferson City, Mo., has construction under way on a 24½-mile natural gas transmission pipe line from Raytown to Liberty, Mo. The new line will tap the main 24-inch pipe line of the Panhandle Eastern Pipe Line Co. at Raytown, and will consist of 8-inch pipe from this point to the Missouri River, and of 6-inch from the river to Liberty. At Liberty it will connect with the Missouri Power & Light Co.'s existing line to Excelsior Springs. Completion is expected December 20.

Excelsior Springs is at present served with natural gas from local fields, which supply is inadequate during peak load periods when it is necessary to supplement the supply with 300 B. t. u. manufactured blue gas enriched with butane to a mixture of 850 B. t. u. content. There are at present 750 consumers in the town. With the new supply additional customers will be added as well as several large industrials, according to H. D. Meuffels, gas engineer for Missouri Power & Light Co.

Hoquiam, Wash., Office Reopening

Washington Gas & Electric Co., Tacoma, Wash., by December 1 was scheduled to reopen its office in Hoquiam, which has been closed for the past several years, the town being served from the Aberdeen district office. Edward Smith is to be manager of the new office.

BUTANE-PROPANE NEWS

Propane Used to Fuel Railway Air Conditioning Unit

A propane-fueled air conditioning unit for railway coaches has been developed by the Waukesha Motor Co., Waukesha, Wis. A test installation on Car 6110 of the Chicago & Northwestern Railway Co. indicates the cooling cost per 1,000 miles to be less than $1.50. The unit, with its independent internal combustion engine, starts, stops and functions entirely by automatic thermostatic control.

Palo Alto Butane-Air Plant to Be Moved

Due to re-zoning of the city of Palo Alto, Calif., the municipal gas distribution center and stand-by butane-air plant, now situated on Middlefield Road between Melville and Kingsley avenues, is to be moved to the municipal power site at Newell Road and Hopkins Avenue. The city hopes to secure $28,000 of P. W. A. funds to cover cost of the move. Contracts are expected to be let not later than December 14.

Philgas Makes Large Propane Shipment to England

The Philgas Department of Phillips Petroleum Co. recently shipped 50 tons of propane from Hokoben, N. J., to the Herbert Green & Co., Ltd., of London. The propane will be used at the company's new oil refinery as a de-waxing agent and solvent in the manufacture of lubricants by the Duosol process.

The shipment was handled in "M" and "N" tanks as deck cargo and in 100-pound cylinders on the S. S. Trentino.

N. B. G. A. and C. G. M. A. Annual Meetings

The annual meeting of the National Bottled Gas Association will be held January 23, following that of the Compressed Gas Manufacturers' Association on January 21 and 22. The meetings will take place in New York City, according to F. R. Fethersston, secretary of both organizations.

Central Plants Due in Nebraska

Butane-air gas service will replace natural gas next spring in seven Nebraska towns supplied by the Nebraska Gas and Fuel Co. In addition, five communities which do not at this time have gas service will be supplied with undiluted propane central stations.

Stand-by at Excelsior, Mo.

The Missouri Power & Light Co., headquartering at Jefferson City, Mo., has installed at its Excelsior Springs, Mo., plant a tank-car capacity butane stand-by installation.

New Quarters for Carlsbad Co.

The Carlsbad, New Mexico, district office of the Pecos Valley Gas Co. on November 1 moved into new quarters. At the new location there is a complete display room for appliances.

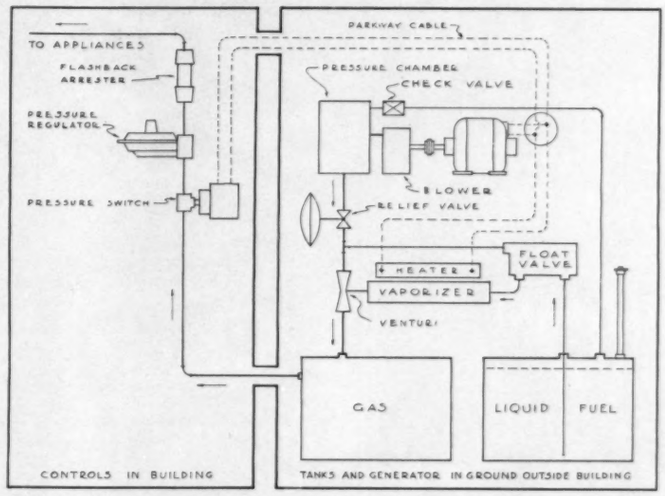

FIG. 1. Diagrammatic sketch of Economy Gas Machine.

Liquefied Petroleum-Air Gas Machine for Large Scale Domestic Use

By EDWARD A. DIETERLE

Consulting Engineer, Chicago, Illinois

INTEREST in various types of gas service which can be rendered in suburban and rural sections has been growing with great rapidity during the past few years, due to the successful sales efforts placed behind bottled gas, and also to the introduction of central plant service of liquefied petroleum gases to small communities in many localities.

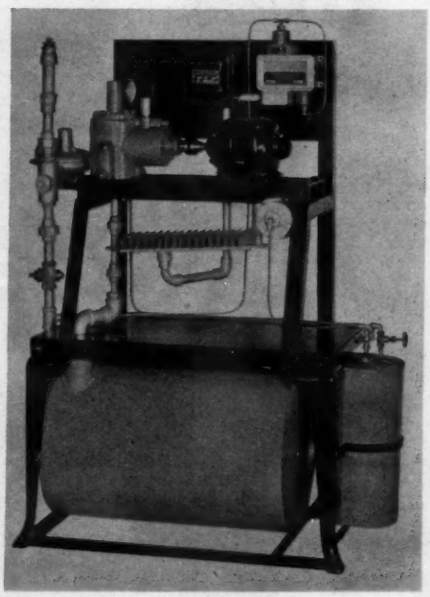

FIG. 2. Portable unit.

As this field developes it becomes apparent that there is a definite need for equipment which will utilize relatively cheap fuels to serve larger individual consumers or small groups of consumers. The Economy Gas Machine, a comparatively new introduction in the field of individual gas generators, meets the requirements of this service, as well as being adapted to stand-by or peak load use by small gas properties.

This equipment ordinarily utilizes pentane or a cut of natural gasoline containing butane, pentane and hexane, as its raw material, converting the liquid fuel into vapor by means of an electrically heated vaporizer and mixing the vapor with air in controlled proportions to maintain a constant desired heating value in the gas-air mixture.

Most of the installations to date are making pentane-air gas of 530 to 600 B.t.u.

To indicate the service of this type equipment in a specific installation reference is had to the unit operating on the estate of Thomas Midgley, Jr., at Worthington, near Columbus, Ohio. Fuel for cooking and water heating is supplied for a home of 27 rooms and five bathrooms, and auxiliary appliances such as a laundry stove are also served.

The installation consists of a two-compartment tank with a dome which houses the gas generating unit. Removing the cover from the dome gives access to the unit. The tank with dome is buried so that the cover is just above the ground. At the Midgley residence it is buried about 50 feet from the house, near

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the rear drive, which facilitates unloading fuel for the machine.

By referring to the diagrammatic sketch (Fig. 1), which is self-explanatory, it will be seen that one compartment is for fuel and the other for gas.

A gas line from the gas reservoir and a parkway electric cable from the dome are laid into the basement of the house where the pressure-actuated switch controlling the operation, and other auxiliary equipment are located.

The switch is of the Mercoid type. It is equipped with a low pressure safety cut out and must be started manually if the pressure drops below ½ pound.

Included in the installation are a flash-back arrester and the usual type gas governor to reduce the pressure from 2-3 pounds to about 6 inches of water column pressure.

Electric and gas meters provide the means of making an exact check on operating costs.

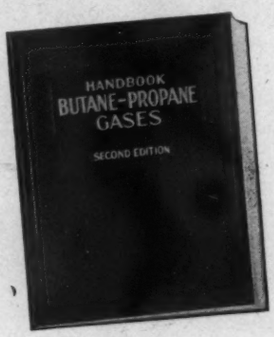
In operation, when the pressure in the gas reservoir drops to 2 pounds the pressure switch completes the circuit, starting the motor and heating the vaporizer in the dome of the machine. When the pressure has built up to 3 pounds the switch interrupts the electric supply, thus stopping the motor and cutting the heat off the vaporizer.

Air from the positive pressure blower (see Fig. 1) is directed into the pressure chamber. From here the air first passes through the check valve into the liquid fuel tank where it provides the pressure to raise the liquid to the float valve. The check valve then holds a pressure of about 5 to 6 pounds over the liquid. After this pressure has been reached the relief valve opens and allows all the air delivered by the blower to pass through the venturi. The lowered pressure at the throat of the venturi draws liquid from the float valve into the vaporizer where the latent heat of vaporization is supplied and the liquid is converted into vapor. The vapor is then drawn into the flowing air at the venturi throat to make the mixture exactly proportioned for the desired heating value gas and then passes into the gas reservoir. From here it is piped into the building through the governor and flash-back arrester to the appliances. The vaporizer is maintained at a temperature above the boiling point of the liquid and the liquid flow is proportional to the air volume through the venturi; thus the proper liquid-air ratio is maintained through all phases of the operating cycle.

Fig. 2 is a photograph of the portable Economy Gas Machine that furnished the gas for an exhibit at the recent American Gas Association Convention in Chicago. This machine made the gas to demonstrate the safety house heating conversion burner cock and safety pilot lighter of the Inland Manufacturing Co. of Chicago. The exhibit was installed on the eighth floor of the hotel where city gas was not available.

The cost of Economy Gas will vary with the price of fuel. However, in round figures the cost per therm will be the same as the cost of the pentane per gallon.

THE ONLY
HANDBOOK OF
BUTANE–
PROPANE
GASES



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Robertshaw Advertising Aimed at Untouched Apartment House Market

TO EDUCATE consumers and dealers on the value of heat control, Williams & Saylor, Inc., New York advertising agency, prepared for the Robertshaw Thermostat Co., an advertising campaign for this heating season designed to reach apartment house tennants as well as the women of the nation generally. The Robertshaw robot figure was created to symbolize the minimum of care, watching and trouble that modern heat-control-equipped gas range cooking affords.

The company's advertising schedule includes space in the Saturday evening Post, direct-by-mail material to New York apartment house tenants and owners, and direct mail and business journal advertising to utilities and dealers.

Chicago and Tulsa Ensign Branches

Ensign Carburetor Co., Huntington Park, Calif., announces that warehouse stocks of Ensign gas and/or gasoline carburetors are now maintained at the following company branches: 450 E. Ohio St., Chicago, and 114-116 E. Ninth St., Tulsa, Okla.

Doyle on Stanpac Directorate

At a recent meeting of the board of directors of Standard Pacific Gas Line, F. F. Doyle was elected to fill the vacancy created by the resignation of W. S. Yard. M. E. Lombardy of the Standard Oil Co. was elected to replace the late Oscar Sutro.

Phillips Orders Propane Tank Cars

Phillips Petroleum Co. has placed an order with the General American Tank Car Co. for 20 additional propane tank cars, for use by the Philgas Department, in butane-propane service.

Motor Fuel Tax Given General Application

EFFECTIVE November 1 the California State Board of Equalization made the 3c per gallon motor fuel tax applicable to all sales of liquefied petroleum gas, both butane and propane, requiring that the tax be paid by the producer at the point of sale.

Under the procedure which has applied for the past two years, since motor trucks on California highways began using butane extensively, the Board allowed butane-propane producers to collect the 3c tax from those who were putting it to motor fuel use on public highways, remitting the tax as a bulk payment each month.

As a result of the present ruling all users of liquefied petroleum gases must now pay the tax and apply individually for refund upon such portion of the fuel as is not put to motor fuel use on public highways. Affidavits must be made and notarized, and the buyer must be prepared to produce invoices, etc. to support his refund claim.

Some 25,000 bottled gas users in California are affected by the new ruling. Distributors are now endeavoring to have the ruling so interpreted as to exclude bottled gas from the motor fuel classification. It is pointed out that bottled gas is not "used or usable" as a motor fuel under the terms of the motor vehicle fuel act, being sold at something over twice the price of gasoline, and in containers which are not legal for motor fuel under the California Industrial Accident Commission Liquefied Petroleum Gases Safety Orders. It is not practical to empty small bottled gas containers into special tanks for motor vehicle fuel, even if it were economical.

Since all of the tax collected on bottled gases would be refundable, distributors urge that it is obviously useless to levy it upon such sales. Collection of the tax from the customer represents a cost which must be passed on in higher fuel charges. The principal objection, of course, is that the inconvenience to the customer of claiming refunds sets up additional sales resistance for bottled gas.

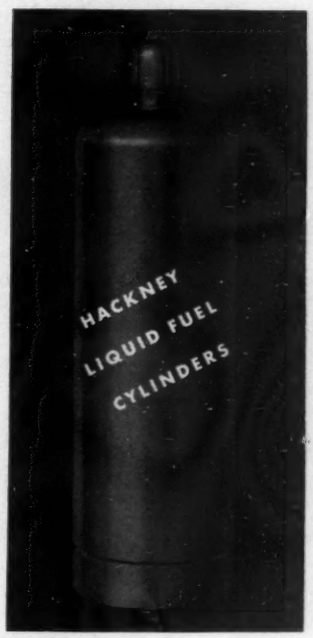
Since the tax applies only in California, distributors must claim exemptions on all out-of-state shipments.

In applying the tax generally to all butane-propane sold, the State Board of Equalization contends that numerous farmers are buying butane tax-free for tractors and using it in motor trucks. Bottled gas distributors take the position that the Board's inspectors can trace such violations with much less inconvenience than the thousands of bottled gas users can apply for refunds. It is also urged that handling the volume of individual refund applications is an unnecessary cost to the state.

New Equipment for Pittsburgh Equitable

Orders for new machinery and new machine tools totalling an expenditure of $250,000 have been placed with 12 different manufacturers by the Pittsburgh Equitable Meter Co. and its subsidiary, the Merco Nordstrom Valve Co.

DOMINATES THE FIELD!



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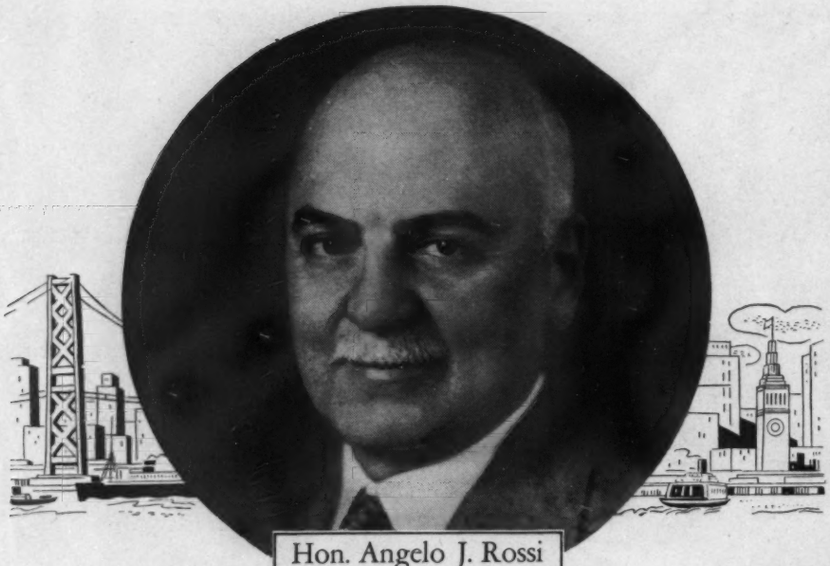
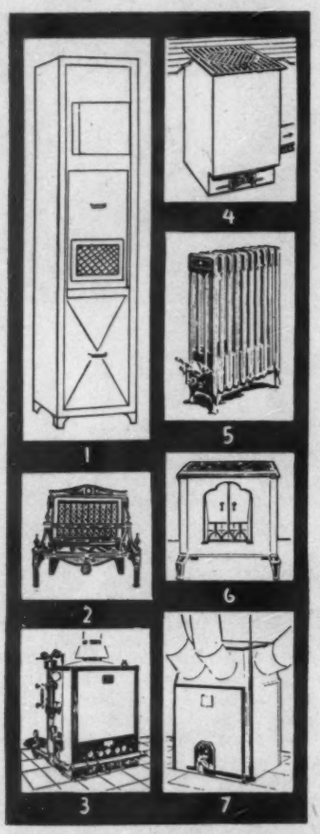


Hon. Angelo J. Rossi
Mayor of San Francisco

The MAYOR SPEAKS on House Heating



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Gas
the modern fuel

1 — FORCED AIR UNIT. New fan-type. Fits any nook or closet, downstairs or up.

2 — RADIANT HEATER for a clean, cheery fire-place.

3 — STEAM BOILER for gas-fired central heating systems.

4 — FLOOR FURNACE. Economical and needs no basement.

5 — GAS STEAM RADIATOR. Individual control for each room.

6 — CIRCULATING HEATER. Quick, low-cost heat for from one to four rooms.

7 — WARM AIR FURNACE. One of the most popular types.

"BRASS TACKS"

DOMESTIC-CONSUMER ADVERTISING

This powerful testimonial on gas house-heating will be seen by approximately 750,000 readers of December "Sunset" Magazine, the Pacific West's own home-and-family monthly, net paid circulation, 200,000. (One of a series of ads mentioning prominent homes and consumers in Southern California, Central California and the Northwest.)

Featuring a regional celebrity, illustrating and describing the principal heating appliances sold on the Pacific Coast, advertising of this type gets down to "brass tacks"; reinforces the local advertising of gas companies, appliance manufacturers and dealers; helps create acceptance in advance of contacts; tends to shorten the time and reduce the cost of selling.

This advertising is financed cooperatively by the gas companies, without one cent of cost to appliance manufacturers or dealers.

PACIFIC COAST GAS ASSOCIATION
(A non-profit service organization of which your gas company is a member)
447 SUTTER STREET
SAN FRANCISCO, CALIFORNIA

With the ASSOCIATIONS

15th Mid-West Gas School One of Most Successful

THE 15th annual Mid-West Gas School and Conference conducted by the Mid-West Gas Association and the Engineering Extension Service of Iowa State College was held at Ames, Iowa, November 6 to 9. According to L. W. Mahone, assistant professor at Ames, the meeting had considerably better attendance than those of the past few years and the exhibit was also larger due to availability of more space.

As a result of the paper, "Condensation in Chimneys," by R. F. Galpin of Iowa Electric Co., Muscatine, Iowa, and Prof. P. A. Cox of Iowa State College Ceramic Engr. Dept., a committee was appointed to study the problem further. Robert L. Klar, distribution engineer of Des Moines Gas Co., was elected chairman of the committee.

Several of the papers from the Ames program will be found elsewhere in this issue of *Western Gas*.

Wisconsin Utilities Association Technical and Operating Section Meeting

T. J. Danehy, manager of Wisconsin Fuel & Light Co., was elecetd chairman of the gas division of the Technical and Operating Section of the Wisconsin Utilities Association, at the annual meeting of the section held in Green Bay, Wisconsin, November 11 and 12. E. C. Brenner, engineer of the Milwaukee Gas Light Co., was elected vice-chairman.

The convention, drawing a record attendance of 261, featured a round table discussion covering production and distribution of gas, in addition to technical papers dealing with the problems of the industry. Seventy-five men attended the round table discussion, with 25 entering into the discussion on production subjects and 22 on distribution subjects. The round-table discussion was of such interest that the meeting ran far beyond the time limit that had been set. The subjects of meters and regulators and the servicing of appliances had an important place in the discussion.

Swigart Completes Five-Week Trip Through Northwest for P.C.G.A.

Carl Swigart, trade relations representative for the Pacific Coast Gas Association, returned to California late in November, following a five-weeks swing around the circuit of member companies in the Northwest. The trip took Mr. Swigart as far east as Lewiston, Idaho, and north to Vancouver, B. C.

Southern-Southwestern Sales Conference Dates Set

Committees of the Southern-Southwestern Sales Conference meeting in Memphis early last month, set up the program for the Conference's 1936 meeting which will take place February 26-28 at the Roosevelt Hotel in New Orleans.

Training Course in Commercial Cooking Sales

THE A. G. A. Hotel and Restaurant Committee under the direction of Chairman T. J. Gallagher, presented an outline of a comprehensive sales training program at the Commercial Gas Sales Conference, October 17, at the 42nd American Gas Association Convention in Chicago. The purpose of this program, prepared by the gas merchandising division of Williams & Saylor, Inc., is to provide a sales training course for hotels and restaurant salesmen of utilities and kitchen supply houses.

Mr. Gallagher pointed out the importance of a thoroughly educated and trained sales organization as a necessary and vital part of the Hotel and Restaurant Committee's activities designed to expand the commercial gas cooking load and to fortify its position against competition. He stressed the tremendous market for new cooking equipment, conservatively figured at $100,000,000. Figures show that more than 250,000 commercial kitchens now use gas. Surveys also indicate that much of this equipment is obsolete and that probably a million gas appliances in these kitchens are in need of replacement.

Competitive fuels, having made advances in the art of utilizing fuel, are making a determined drive to capture this market, and for this reason, Mr. Gallagher pointed out, not only must the utility salesmen be thoroughly trained, but the kitchen supply house salesmen as well must be educated to a greater appreciation of the advantages and economies of modern gas equipment and the superiority of gas fuel for general quantity cooking requirements.

The training course proposes to break down various fuels into a common unit of measure so that their advantages and disadvantages as compared with gas will be readily understood by salesmen who can then intelligently analyze and discuss them all. It will analyze equipment and fuels to determine the suitability of these fuels for various types of cooking requirements, summerizing through comparative charts for easy analysis. It also proposes to develop trained kitchen engineers or cookery engineers who are competent to handle the equipment of new establishments and to re-engineer and re-equip kitchens now operating obsolete gas equipment.

The course should also develop a formula for applying fuel and equipment to the needs of various types of hotels, restaurants and institutions. Material will be presented that will be helpful to utilities in meeting the "cost of fuel" problem by lowering operating costs without lowering rates, by the better and more economical use of present gas equipment and by the conversion of equipment to automatic heat control.

The training course will cover in detail the importance of steam tables, coffee urns, rinse tanks, etc., in building up gas consumption and will discuss their relationship to the general fuel cost when competitive fuels are being considered. Up-to-date information on oil and oil equipment, electricity and electricity equipment, coal and coal equipment, gas and gas equipment will be provided. It will also present information on the selling process, on markets, on proper approach, proper canvass, proper close. It will likewise provide a formula for accurate, effective kitchen surveys to determine the equipment needs, fuel needs and service needs of all types of hotels, restaurants and institutions. Stress will be laid on the importance of service, comparing utility service with dealer service, making this often neglected advantage of gas a selling factor.

Work Getting Under Way for New P.C.G.A. Year

IN ADDITION to the committee and individual appointments to Pacific Coast Gas Association 1936 projects, announced in the last two issues of *Western Gas*, the following information is received from Clifford Johnstone, managing director for the P.C.G.A.:

George R. Horning, Seattle Gas Co., has accepted chairmanship of the Production Committee, Technical Section.

Lester E. Green, Los Angeles Gas and Electric Corp., chairman of the Customers and General Accounting Section, has appointed O. L. Moore, Los Angeles Gas and Electric Corp., as chairman of a committee on Customers Accounting as it Affects Public Relations, and C. T. Burns, Southern California Gas Co., as chairman of a committee on Credit Problems on Long Term Contracts.

Otto Goldkamp, San Diego Consolidated Gas and Electric Co., chairman of the Distribution Committee, has appointed H. S. Harris, Los Angeles Gas and Electric Corp., as chairman of a committee on Breaking in Meters Before Adjustment. Serving on this committee with Mr. Harris will be Guy Corfield, Los Angeles Gas and Electric Corp.; Wayland Capwell, San Diego Consolidated Gas and Electric Co.; B. Devine, Southern Counties Gas Co. of Calif.; Frank Honberger, Southern California Gas Co.; Roy Stewart, Pacific Gas and Electric Co.; and Fred Winslow, Southern Counties Gas Co. of Calif.

George Mackenzie, Portland Gas & Coke Co., will prepare a report on the "Desirability of Uniforming Meter Readers."

Guy Corfield, chairman of the Utilization Committee, has appointed T. G. Wallace, Los Angeles Gas and Electric Corp., as chairman of a committee to study Thermostats for Gas Space Heaters.

I'M THE ROBERTSHAW OVEN-HEAT-CONTROL ROBOT DIAL
You'll find me on this gas range
When you turn me to the oven temperature
watch the baking and fruition instead
of you. Use me and I'll give you many
a vacation from the kitchen
SEE REVERSE SIDE FOR PRICE
OF THIS MODERN GAS RANGE

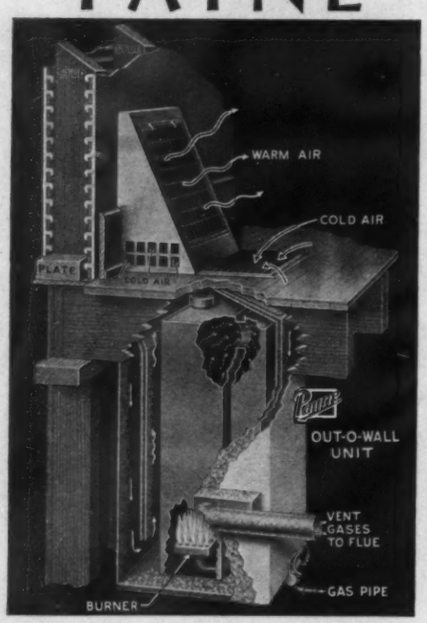
"HERE LADY-

buy *this* gas range because it has Robertshaw oven-heat-control!" That, in effect, is what this lively little figure shouts when you hang him on your Robertshaw-equipped gas ranges. He ties right up with Robertshaw national advertising—running now.

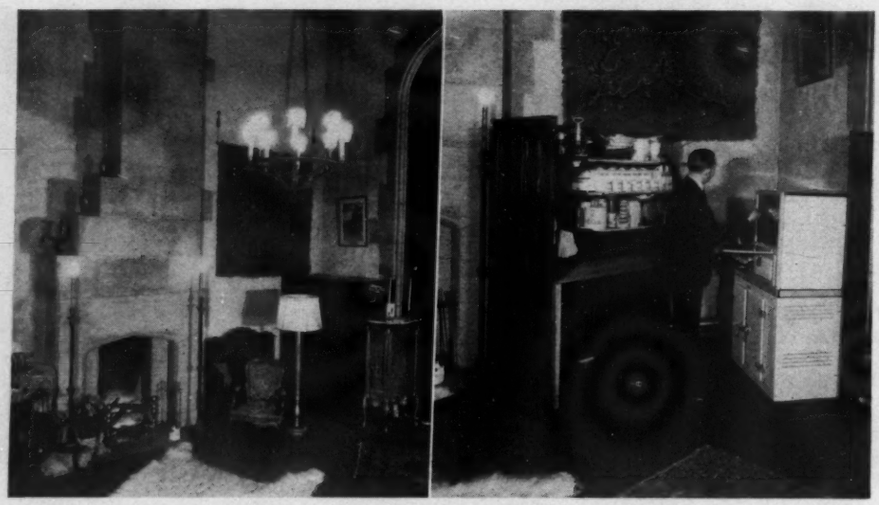
He'll help you sell. He's a price tag, too. Write for a quantity.

ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD, PA.

PAYNE



SINGLE REGISTER FURNACE
Write for Information
PAYNE FURNACE & SUPPLY CO.
Beverly Hills California



LEFT: This view shows the Mystery Chef's kitchen folded up in the corner of his elaborate one-room penthouse apartment, in New York City. It fills a space slightly larger than that occupied by an upright piano. RIGHT: Showing the Mystery Chef at work. The cooking equipment is a combination gas range and refrigerator.

Mystery Chef Radio Broadcasts Begin December 3

REGIONAL Advertisers, Inc., organized last October to supervise details of the East Coast radio program, early in November informed all participating companies that sufficient support had been received to insure "The Mystery Chef" broadcasts as scheduled. Opening December 3 on Syracuse and Rochester stations and December 4 on all remaining stations in the network, these programs will be heard in 15-minute periods two evenings each week.

As of November 25, there were 5,302,472 out of a possible 6,000,000 meters in the area covered—Washington, D. C. to Portland, Maine—committed to sharing costs of the program. The recipe book to be distributed in connection with the program broadcasts, entitled "Be an Artist at the Gas Range," is now being printed and will be delivered about December 15. Other promotional material is under preparation and is being distributed to the participating companies.

Considerable publicity will be built around the personality of The Mystery Chef, who is seen in the views above preparing a gas-cooked repast in his New York penthouse apartment.

Milpitas Line Completion Awaiting Pipe Delivery

CONSTRUCTION on the Pacific Gas and Electric Co.'s new 22-inch natural gas pipe line from Milpitas to San Francisco was halted early in November because the ship carrying the steel pipe also carries "hot" cargo, and is held up in San Pedro harbor.

F. F. Doyle, in charge of the natural gas division of Pacific Gas and Electric Co., reports that construction of this line, which parallels the original 20-inch line for much of the distance, was carried forward on schedule to within 10 miles of the Potrero plant in San Francisco. Five miles of ditch is ready, awaiting delivery of the pipe. Work will be resumed and the line completed as soon as the pipe is delivered.

This line, in addition to serving areas where natural gas is not now available, will carry an additional supply of gas for the constantly increasing San Francisco demand, as well as provide the assurance of uninterrupted service in case of accident to one of the lines.

▲

AT RIGHT:

A section of P. G. and E.'s Milpitas-San Francisco line, in hilly terrain near Palo Alto, Calif. Photograph courtesy of The Lincoln Electric Co.

▼

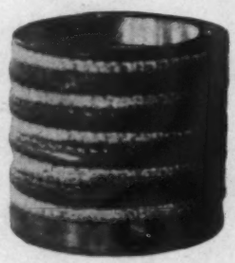
Think CAREFULLY BEFORE YOU CHOOSE

Beginning with January bills, electric rates throughout the P. G. and E. system go down. Everybody will save in the home. People who own stores will save twice—once in their homes and again on their commercial lighting bills. If your store is adequately lighted—Fine!, you can pocket the difference. But if it isn't, we have a suggestion to make: Invest your savings in more light. We make this suggestion because we know that light, prudently used, is a splendid business stimulant. Stores are continually making tests, experimenting with various degrees of light intensity, and always the conclusions are the same—more light; more customers, and more sales per customer. If you'd like, we will make a Sight Meter test of the lighting facilities in your establishment. We make these tests without charge. And remember, if you find that you do need more light, it won't necessarily follow that you'll have to pay more money. The reductions in rates may take care of the additional light you need, leaving your bills the same. In any event, it costs nothing to find out. Phone us or drop us a postcard today!

P · G · and E ·

PACIFIC GAS AND ELECTRIC COMPANY
Owned, operated and managed by Californians

LIGHT UP for better business with CHEAP ELECTRICITY



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Accordion Packing
For Hot Oils Containing
Sulphur, Acids or Alkalies

Accordion Packing Rings are built in all sizes, and are designed for any make of pump at any pressure and for all operating temperatures up to 850° Fahr.

Propane, Butane, other light oils, and heavy oils and tars of any gravity may be effectively sealed.

For additional information write for Technical Bulletin No. 390.

THE TEXACONE COMPANY
INCORPORATED IN TEXAS
MANUFACTURERS OF
High Pressure Packing
and Specialties

2007-9 W. Commerce DALLAS, TEXAS

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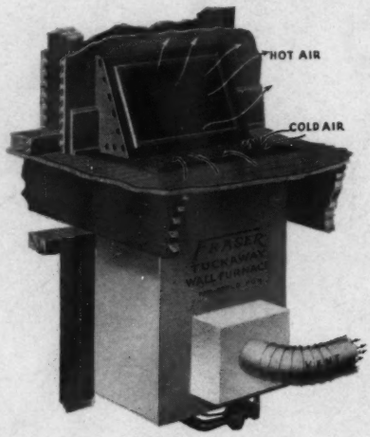
TUCK-A-WAY



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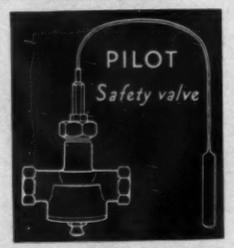
Furnace Construction
Made in 4 sizes

Manufactured by
Fraser Furnace Company
Stockton, Calif.
Distributed by
H. R. Basford Company
San Francisco Los Angeles

BUILD YOUR HOUSEHEATING LOAD
WITH KLIXON CONTROLS

These two advanced Klixon devices give exact automatic temperature control and assure positive pilot protection for your gas-fired space heaters . . . provide sales features that make it easy to sell gas heating.

Write today for descriptive bulletins.



SPENCER THERMOSTAT COMPANY
Unit of Metals & Controls Corporation
34 FOREST STREET • ATTLEBORO, MASSACHUSETTS

A. G. A. Approved

A
PEERLESS
RADIANT GAS HEATER

It is a practical as well as attractive Holiday Gift.

Many Designs to Select From
WRITE FOR LITERATURE

PEERLESS MANUFACTURING CORP.
1400 W. ORMSBY
LOUISVILLE, KENTUCKY

Underground Gas Storage Experience in Kentucky

(Continued from Page 16)

locations to show that except for a few very small areas it was saturated with salt water for miles in every direction whenever it had any porosity.

The fact that it took a constantly increasing amount of gas to give a unit increase in rock pressure when the reservoir was being filled is easily accounted for. Obviously as the water was pushed down the slope the size of the reservoir being filled continuously increased, necessitating more and more gas to secure a given rise in pressure. The reason for the constantly increasing amount of gas secured per pound drop in rock pressure when the reservoir was being emptied is not quite so obvious, but may be accounted for as follows:

If the reservoir had been a completely sealed container the drop in rock pressure would have been uniform for each unit of gas withdrawn. If we take the pressure drop obtaining when the gas production was begun, that is, about 4.5 million cubic feet per one pound drop, the reservoir contained approximately 4.5 million times 125 (the original rock pressure) or 562 million cubic feet of gas. Allowing for the deviation of methane from Boyle's Law would make this amount about 575 million cubic feet.

However, the reservoir was not a sealed container, but might be likened to a "U" tube holding gas in one of its arms under the pressure of a column of water. If this water had been connected with a replenishing source and had moved in as fast as the gas was withdrawn, when the reservoir was emptied of gas the level of the water would have risen from 180 to approximately 265 feet above sea level or 85 feet, and the pressure on the last remaining foot of gas would have been 34 pounds less than it originally was. In such a case there would have been recovered from the reservoir 575 million cubic feet of gas for a 34-pound drop in rock pressure or 17 million cubic feet per pound.

Actually, the water could not move in as fast as the gas moved out, but it did move up the slope constantly during such time as gas was being withdrawn. Starting with the 4.5 million recovery per pound drop in rock pressure, the recovery per pound would possibly eventually have shown as 17 million and therefore since it was trying to reach this higher figure, the production per pound drop in rock pressure would increase as the reservoir was depleted.

After 1932, gas was taken out of the reservoir during the next 18 months to the extent of 235 million cubic feet, during the next six months 190 million cubic feet was put in and during the winter of 1934 and up to August, 1935, a total of 150 million cubic feet was taken out.

Unfortunately, data on pressure and water level changes for this period could not be used to check closely with those previously obtained due to the fact that a well was drilled into the reservoir by an outside operator and information on the gas used from this well was not obtainable. However, using estimates of such use, the gas put into the

reservoir during the four storage periods seemed to be being accounted for with an accuracy within that of the probable errors in measurement.

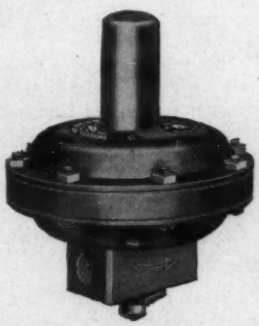
As previously mentioned, all the data obtained during the five-year experiment indicate that, in this particular case at least, there is a uniform water drive on the gas and that the water can be pushed back down the slope by the use of pressures equivalent to those the release of which permitted the water to move up the structure.

One other bit of information obtained from the experiment may be of interest.

The original gas in the reservoir contained 500 grains of sulphur (in the form of hydrogen sulphide) per 100 cubic feet. Gas stored contained no hydrogen sulphide. After the first storage period, it was apparent that there was only a slow diffusion between the cap of stored gas (all of which was put in at the top of the structure) and the remaining original gas. At the beginning of the second withdrawal the highest wells gave sulphur-free gas, the edge wells 500-grain gas and the in-between wells produced gas containing various amounts of sulphur. As gas continued to be withdrawn, however, the highest wells began making increasing proportions of hydrogen sulphide and at the end of the producing cycle the current set up by the flow of the gas and the movement of the water seemed to have hastened the mixing to such an extent that there was practically no difference in the sulphur content of gas taken from the various wells. Similar conditions prevailed during subsequent withdrawal periods. At the present time the average hydrogen sulphide content of the gas in the reservoir is just what it calculates to be from the dilution of the original contents with the sulphur-free gas.

Pittsburgh Equitable Announces Emco Safety Seal Regulator

PITTSBURGH Equitable Meter Co. has announced its Emco Safety Seal Regulator, designed for small gas appliances such as refrigerators and ranges. The regulator has two diaphragms, the lower one being the customary control diaphragm, while the



upper one is actuated only in the event of control diaphragm failure or seepage through it. The upper diaphragm then closes leakage through the top of the regulator and shuts off the main gas flow. The safety features make it possible to install the regulator in kitchens without its being necessary to run a vent from the diaphragm chamber.

COMMERCIAL HEATING BULLETIN

This new bulletin gives valuable suggestions and information on all commercial heating installations as well as details of N. G. E. Gas Burners applicable to such installations. Write for your free copy today.

Illustrated above is the complete assembly of the N. G. E. Series 400 Gas Burner.

N.G.E.

Series 400 Gas Burner

FOR SMALL SQUARE OR RECTANGULAR FIREBOX BOILERS

The N. G. E. Series 400 Gas Burner is particularly adaptable to small cast iron or steel boilers with square or rectangular fireboxes. It occupies very little headroom in the furnace. By such design, maximum furnace volume is retained for the travel of the products of combustion.

HIGH CAPACITIES

Because the length of travel of the products of combustion is not very great in a small boiler, it is necessary to complete combustion as rapidly as possible or a high stack loss will result. The Series 400 offers high capacities; the N. G. E. design of rectangular raised burner heads with drilled ports assures complete and rapid combustion.

OPERATING PRESSURES AND CONTROL...

The Series 400 Burner either singly or in multiples is very easy to install, and is self-cleaning; operates at all firing ranges quietly and without vibration.

Operating range: 2 inches of water to 2 lbs. gas pressure, enabling it to meet practically all commercial heating requirements. The Series 400 Burner is equipped with a special adjustable orifice. Its over-all design permits either right angle or parallel manifolding.

MANIFOLDING FLEXIBILITY

The N. G. E. Series 400 Gas Burner is one of the complete line of N. G. E. burners developed for all classes of commercial heating. This N. G. E. line of conversion burner equipment will meet the most rigid requirements with respect to high efficiency, low maintenance and cost commensurate with results to be obtained. Inquiries will receive prompt attention.

NATURAL GAS EQUIPMENT INC.

1123 Harrison St. San Francisco — Petroleum Securities Bldg. Los Angeles — Arizona Distributors Crane Co.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

AIR CONDITIONING

Electrogas

HEATING EQUIPMENT

FURNACES BLOWERS FILTERS WASHERS

Write for attractive Dealer proposition

ELECTROGAS FURNACE & MANUFACTURING CO.

2575 Bayshore Boulevard, San Francisco

View of main laboratory room of the Chicago Vitreous Enamel Product Co.

Chicago Enamel Laboratory Puts Gas to Varied Uses

CHICAGO Vitreous Enamel Product Co., in its new laboratory addition to the plant at Cicero, Ill., will conduct a wide range of process experimentation, in which gas will find many uses.

The laboratory is devoted to the research, development and control of porcelain enamels for gas appliances and similiar products. The accompanying view of the main laboratory room gives an idea of its modernity of design. It contains approximately 10,000 sq. ft. of floor area and 12,718 sq. ft. of porcelain enamel were used in finishing the interior walls, furniture and fixtures.

The chief divisions of the laboratory are main laboratory, analytical chemical laboratory, office of the director of research, color and enamel control laboratory room, experimental smelting department and smelt record room. All of the experimental smelters are gas-fired. The chemical laboratory has a work table that contains combustion equipment, muffle furnace for igniting precipitates and thermostatically controlled baking equipment.

In the manufacture of enamels, after the raw materials have been checked, they are mixed in the proper proportions and placed in a smelter where they are kept at white heat in a molten state for from 2 to 3½ hours. The molten mass is then released into water which shatters it into small fragments, in which state the enamel is known as "frit." The next step is to grind the frit with water, clay and pigments, until it emerges from this phase of the process as enamel.

In applying the enamel to the metal to be coated, a first coat known as "ground" is either sprayed onto the surface or the metal is dipped into a vat of the liquid. The enameled piece is then placed in a furnace and fired at regulated temperatures depending on the type of enamel, the average temperature being about 1,600° F. The enamel is fused into the pores of the metal until it virtually becomes a part of it. The process is then repeated two more times with colored enamel.

Combustion Controls

PERFECTED TO THE NTH DEGREE FOR ALL

POWER and HEATING BOILERS

MANUFACTURED IN SIZES AND TYPES

FOR EVERY POSSIBLE REQUIREMENT

where precision controls are wanted at the price of ordinary controls.

Control the draft as well as the fires. The perfect combination, Nemec Burners and Controls. Dealers Get Busy.

Nemec Combustion Engineers, Whittier, Calif.

REFRACTORIES

GENERAL CERAMICS COMPANY

REFRACTORIES

For Conversion Burners, Circulating Heaters, etc.

Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.

General Ceramics Company, 30 Rockefeller Plaza, New York

Eighth Revised Edition of Gas Range Standards Approved

THE eighth revised edition of "American Standard Approval Requirements for Gas Ranges," Z21.1-1935, adopted by the A. G. A. Approval Requirements Committee, which supersedes the standards in effect since June 1, 1934, has been approved by the American Standards Association and will be effective January 1, 1936.

Among the changes are several requirements covering appliance strength and rigidity under various types of loads applied at various points, clauses specifying minimum boiler temperatures and heating speeds, increases in the stringency of top burner lighter performance stipulations and a more or less extensive correlation of the standards covering gas range accessories with the corresponding American Standard listing requirements for such devices. In all some 529 stipulations are laid down, all of which must be met by A. G. A. approved appliances. Upwards of 93 per cent of all gas ranges sold per year in the United States and Canada bear the A. G. A. Laboratory Seal of Approval.

Changes for Republic Steel District Sales Managers

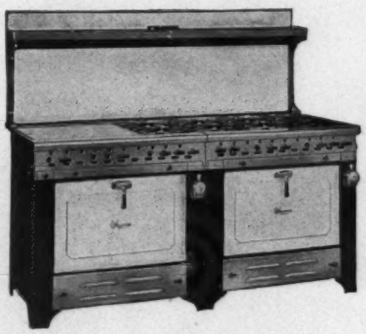
The appointment of Robert J. Working to the post of district sales manager at Birmingham, Ala., for the Republic Steel Corp. is announced by N. J. Clarke, vice-president in charge of sales. The position was formerly occupied by Kenneth D. Mann who resigned recently to become executive vice-president of Truscon Steel Co.

Paul R. Johnston has been named to fill Mr. Working's former post as district sales manager at Cincinnati, Ohio.

Restaurants GAIN BIG SAVINGS

with these modern, insulated ranges

ACCLAIMED as Fully 5 years ahead in Designs, Economy and Convenience.
UNEXCELLED for QUALITY any place in America!



Wedgewood's known reputation for building the finest gas ranges is well emphasized by this splendid line of Heavy Duty Restaurant Ranges. They are designed especially for Pacific Coast requirements. Worthwhile savings in labor and gas are gained because of the exact heat regulated, heavily insulated ovens. Rock wool insulation 3½ inches thick keeps the heat in the oven and out of the kitchen.

The new heavily insulated ovens reduce meat shrinkage appreciably.

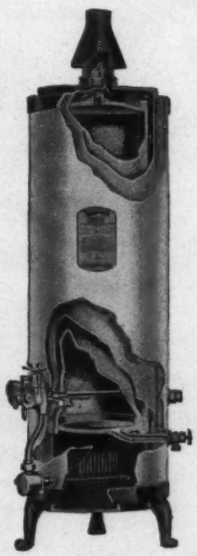
JAMES GRAHAM MANUFACTURING CO.
San Francisco, Newark, Los Angeles, California
Portland, Oregon

WEDGEWOOD

Send for this **NEW BULLETIN**

A newly printed Bulletin showing the many beautiful Wedgewood Restaurant Range Models now available. Send for your copy today!

HOTZONE Welsbach HOTZONE



Hotzone Self-Action Storage Gas Water Heater

Heat With Luminous Flame

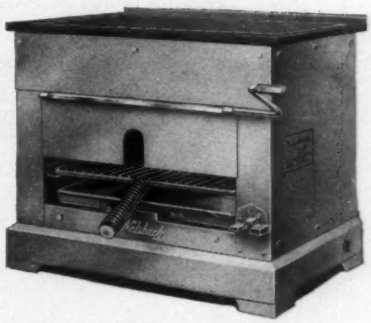
Hotzone Self-Action Storage Gas Water Heaters, equipped with luminous flame burners, have an established reputation for high efficiency with low operating and service costs and are being used by many gas companies in their Rental Campaigns.

Heaters are made in all domestic sizes with 300 lb. test, Galvanized or Everdur tank. Write for details.

Broil With Infra-Red Rays

A convenient size Broiler Griddle for back bars in drug stores and lunch rooms where space is limited.

Equipped with the Welsbach patented Radiant Broiler Burner whose penetrating infra-red rays greatly improve the taste and appearance of food. Foods prepared in half the time.



Model No. 11

Welsbach Hotzone broiler griddle for back bar service

Larger Models available

Write for Particulars

WELSBACH COMPANY
CHICAGO **Gloucester, N. J.** SAN FRANCISCO

Since 1887, Pioneers in the Manufacture of Gas Burning Appliances.

Terms, Credits, and Collections as Sales Aids

(Continued from Page 14)

a total loss than to tear out the installation.

The consideration of the equipment alone remains. In general, equipment in use for six months or more depreciates about 50 per cent. Thus, the question remains as to whether to salvage 25 per cent of an investment by removing the job or leaving it in, in the hope of future use and ensuing revenue to the company. The answer to this problem is not difficult. If the job in question is an installed bake oven burner, a gas burner and controls in a boiler, or burners in a kiln, it is more than likely that someone will continue to operate the property and it is then best to leave the installation intact. Someone familiar with the job, frequently the salesman, can pass judgment on the expediency of gambling with the future instead of cutting down present collection losses by salvaging a small part of the investment through repossession.

If the original purchaser is still operating, and paying his service bills but not paying on the equipment, repossession should be made only as a last resort. In case of the customer's failure before paying out on his contracts, in most cases, the utility would frequently gain by leaving the equipment intact in expectation of its use by a succeeding occupant of the premises or at least, removing only the appliance and leaving the installation.

HYDRAUGER

MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.

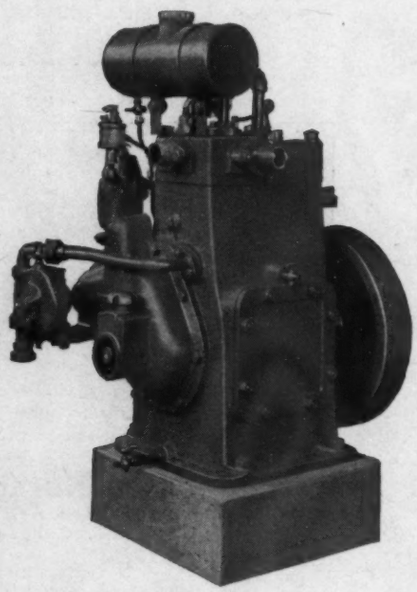
HYDRAUGER CORPORATION, Ltd.
116 New Montgomery St.
San Francisco, Calif.

Lone Star Gasoline Absorption Plant Nears Completion

Completion of the Lone Star Gas Co.'s gasoline absorption plant, now under construction at Trinidad, Texas, on the route of the company's new Long Lake-Cayuga-Irving gas pipe line, is scheduled for January 1. The plant will have a daily capacity of 100,000,000 cu. ft. of gas and 10,000 gallons of gasoline. The operating units of the plant are widely separated on a 20-acre site for safety considerations. It is to be the first gasoline absorption plant to operate on gas from the Long Lake and Cayuga fields.

Cooper-Bessemer Announces New Engine Starter Unit

A NEW single-stage air compressor for starting gas and Diesel engines, capable of filling a tank of 6 cu. ft. capacity up to 200 pounds pressure in 5 minutes or up to 250 pounds in 9½ minutes, is now offered by The Cooper-Bessemer Corp. The new



special Cooper-Bessemer unit, to be known as the GX3A, runs on either gas or gasoline. It is a simple, self-contained combination engine and compressor. Ford parts are largely used, pistons, piston rings, connecting rods, connecting-rod bearings, engine valves, and many smaller parts being thus obtained.

Both power and compressor cylinders, cast in one piece, are water-jacketed. The power-cylinder head, which is a separate casting, is of the automotive type, water-cooled, and carries a spark plug. A Ford Model B gasoline carburetor and an adjustable gas mixing valve are furnished as standard equipment, also a rotary-type magneto with impulse coupling for hand starting. Where gas is the fuel, it is possible to start the engine on gas; but the recommended procedure is to start on gasoline, then switch to gas. A one-gallon gasoline tank is mounted over the compressor and connected to the carburetor.

Splash lubrication is automatically provided for all parts. Oil reservoirs feed lubricant to the main bearings, valve tappets, camshaft bearings, governors, and magneto drive.

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

The Big Name in
HEATING
and **AIR CONDITIONING**
is
MUELLER-MILWAUKEE

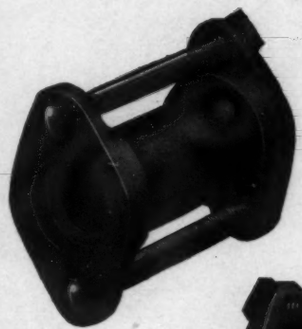
Increased Sales Force for Portland

The commercial department of the Portland (Ore.) Gas & Coke Co. has added six salesmen to its sales force, according to J. D. Ingram, residential sales manager.

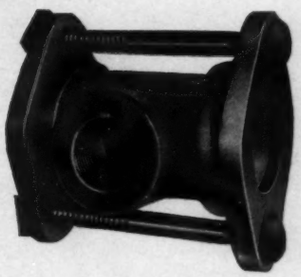
Larger Quarters for Fayettville

To accommodate increased business, the Fayettville office of the Arkansas Western Gas Co. was recently remodeled and enlarged.

DAYTON COUPLINGS for SERVICE LINES



No. 1 Coupling ½ to 2"



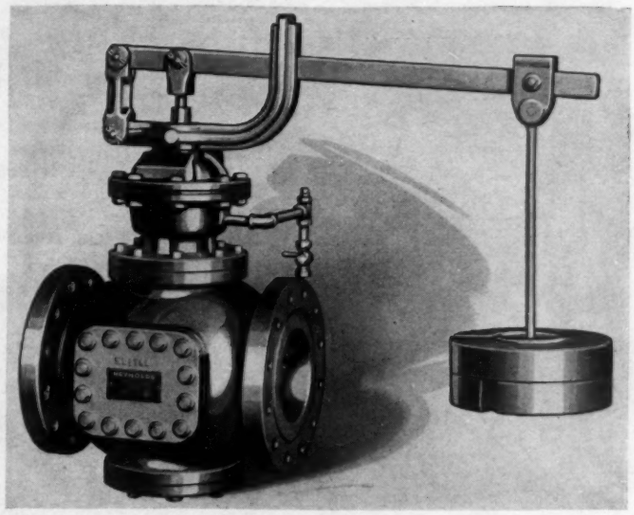
Service Coupling ½ to 4"

The No. 1 Coupling furnishes a most efficient expansion joint for connecting service lines. The side outlet of the Service Coupling may be tapped for any size opening required.

Both Couplings provide a connection that is rapidly and easily applied, yet permanently tight and leak-proof. Gaskets of the proper type are available for any service.

THE NATIONAL-SUPERIOR CO.
DAYTON PIPE COUPLING DIVISION
Dayton, Ohio

WIDER RANGE



Reynolds' New High Pressure Line Regulator, shown above without the auxiliary bowl, features a wider range of delivery pressure control.

For outlet pressure, from 2 to 100 pounds in the line, this unit assures absolutely accurate and dependable control. This variance in outlet pressure is made possible by the use of four different sizes of diaphragm cases.

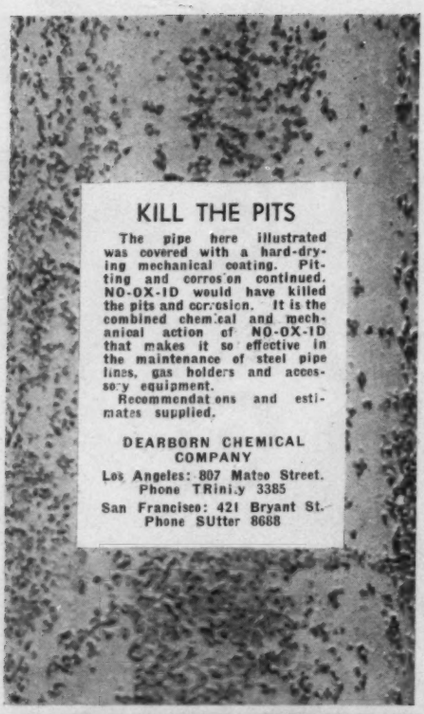
On inlet pressure the range is up to 650 pounds. The Reynolds New High Pressure Line Regulator can be furnished in cast iron, steel or bronze body, depending on pressure requirements. This Regulator is also furnished with auxiliary bowl if desired. Efficiency tests made at the factory are filed for reference and are used later for checking all of these units in service. This system assures continued accuracy, safety, years of service, and economic upkeep. Write for details.

Reynolds Branch Offices:
421 Dwight Building
Kansas City, Mo.
2nd Unit Santa Fe Bldg.
Dallas, Texas

Representatives:
Eastern Appliance Co.
Boston, Mass.
F. E. Newberry,
Avon, N. J.
G. H. Unkefer
428 Boyd Street
Los Angeles, Calif.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892


KILL THE PITS
The pipe here illustrated was covered with a hard-drying mechanical coating. Pitting and corrosion continued. NO-OX-ID would have killed the pits and corrosion. It is the combined chemical and mechanical action of NO-OX-ID that makes it so effective in the maintenance of steel pipe lines, gas holders and accessory equipment.
Recommendations and estimates supplied.
DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Matso Street. Phone TRinity 3385
San Francisco: 421 Bryant St. Phone SUtter 8688

NO-OX-ID
IRON + OX = RUST
TRADE MARK
The Original Rust Preventive

Soboba
MINERAL HOT SPRINGS

REST, play and enjoy life at Soboba Every facility for your comfort and convenience. • 89 miles--paved, no grades--from Los Angeles. • Unexcelled curative mineral waters. • Riding, golf, swimming and hiking. • Excellent cuisine with moderate prices. • European plan from $1.50 to $4.50. Write for booklet to

JOHN G ALTHOUSE, *Owner and Manager*

Muskegon Public Gets the "Truth About Cooking"

(Continued from Page 20)

"All things considered, it can be said that gas and electricity set the highest standard of fuel cleanliness. However, it would not be true to say that gas is cleaner than electricity, nor would it be true to say that electricity is cleaner than gas.

"If properly adjusted burners and heating elements are kept clean, neither the gas nor the electric range will smudge pots and pans.

"The soiling of walls and ceilings over a cooking appliance is not due to the fuel which is used, but to the hot vapors which rise from the food while it is being cooked, and the fine particles of dust which are in the air. This soiling will take place even when gas and electricity are used.

"Warm air rising from a steam radiator does the same thing, yet the steam and the radiator are absolutely clean.

"Gas with its hot, clear, blue flame is as clean as the cleanest fuel, and the modern gas range with its bright, full-enamel finish, removable burners and trays which can be washed, is the cooking appliance which is easiest to keep clean."

An electric range advertisement provided the fuel for the sixth of the series, a quotation from the advertisement reading, "Electric cooking has a deliciuosly different flavor —a natural flavor in food. Meats and vegetables cook to melting tenderness in their own juices."

Expressing herself as feeling that the foregoing statement, to say the least, is misleading, the home service director adds that numerous tests indicate that electric cooking does not offer any such advantages over other methods. Said the copy:

"Experiments conducted at Iowa State College showed that there was no noticeable difference in the texture, appearance or flavor of meat when prepared in a gas or an electric oven.

"A nationally famous home economist after extensive cooking tests on both gas and electric ranges published the statement, 'No flavor differences could be detected in any product, regardless of the fuel used.'

"The taste of food depends mainly upon the cook, not the fuel. A good cook can take a wash tub, cover it with tin, use charcoal, and get good results provided the heat is properly applied.

"Insofar as the application of heat affects the flavor of foods, the gas range is superior to the electric range, for its oven temperature regulator is more accurate than that of the electric range, and its top burners have an infinite number of cooking speeds—not three."

"Not so long ago," begins No. 7, "I overheard a conversation between an electric range salesman and a prospective customer. The electric range salesman claimed that a gas range exhausts the oxygen in the air and fills the kitchen with dangerous fumes which cause headache, drowsiness, nervousness and other ailments.

"Any statement like the foregoing is not true," states the home service director. "When gas burns it does use air, but the amount of air consumed is of no consequence. Careful and thorough tests conducted by a nationally known testing laboratory in Cleveland, Ohio, conclusively prove that the proper use of a gas range is in no way detrimental to health.

"The combustion of gas produces water vapor and carbon dioxide, both of which are absolutely harmless, odorless, colorless and tasteless. The introduction of moisture into the atmosphere is highly desirable almost every day in the year, and most of you recognize carbon dioxide as the ingredient which makes the bubbles in charged beverages.

"There are between 15,000,000 and 16,000,000 gas ranges in use in the United States, and surely, if the gas range were detrimental to health it would have been discovered long before the electric range salesman hit upon the idea."—"Let's be sensible," this letter reads in closing.

Letter No. 8 opens, "An electric company in eastern Michigan published the following statement: 'You have heard the term *modern* applied to many stoves. But only an electric range is truly modern. Fuel stoves still use the same cooking method that was in vogue 50 years ago . . . . . These stoves look up-to-date, perhaps—but their method of operation is unchanged. They still depend upon combustion to obtain heat'."

Answering, the home service director writes, "I believe this is typical of much of the propaganda which is being used to persuade people that the electric range is something new and better than any other appliance.

"Electric cooking is not new. Obtaining heat from a glowing wire is many years old. It is true that improvements have been made in the appliance, but the fundamental principle remains the same.

"Cooking with gas is not new either. But likewise many improvements have been made on today's gas range as compared with the 'old-timers.'

"It isn't the fuel that is used, but the way in which it is used, which determines whether its use is old-fashioned or up-to-date.

"The old oaken bucket is out-moded by modern plumbing which supplies water at the turn of the faucet. But the use of water is as modern today as it was in Adam's time.

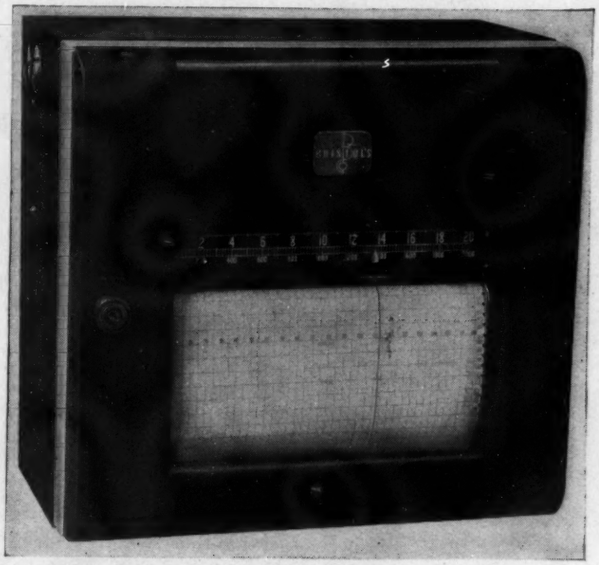
"Certainly, the gas range still depends upon combustion, because nature or man never made another fuel which equals natural gas.

"The modern gas range can do everything any other cooking appliance can do, *and do it better.* Improvements in today's gas range keep gas cooking in the foreground as the best method for preparing foods. In making this comparison I include electric cooking," says the home service director.

The concluding two letters of the series take up the subject of broiling and baking, the last letter stating that tests were made in a large research laboratory in Cleveland, using the latest, speediest elements of the electric range and the latest type of gas

Presenting

a masterpiece of pyrometer achievement



THE most notable advance in years in pyrometer construction, this new Bristol's Wide-Strip Potentiometer Pyrometer reflects throughout the touch of master craftsmanship. From the handsome, lustrous case designed by one of the country's foremost industrial artists to the super-sensitive yet heavy duty galvanometer of Weston precision, quality prevails.

This latest achievement by the pioneer builders of pyrometers sets a new standard in the art of high temperature measurement by the potentiometer method. It possesses a surprisingly simple mechanism,—for measuring, balancing and recording. Although of fine accuracy,—it welcomes hard service.

Little care is needed as all principal shafts are equipped with ball bearings. Because the recording pen and slide wire contact are mounted integrally, and since friction clutches and ratchets are not used, back lash and lost motion are eliminated. Simplicity throughout assures long life with a minimum of service.

BRISTOL'S WIDE-STRIP POTENTIOMETER PYROMETER CHALLENGES COMPARISON. Its unique method of maintaining emf balance and of magnifying scarcely perceptible deflections, its speed of response, AUTOMATIC STANDARDIZING, the unusually wide chart, and extra large indicating scale, all deserve your closest attention.

Catalog No. 1450 contains the details you will be interested in. Write for a copy.

THE BRISTOL COMPANY

Branch Offices: Rialto Bldg., San Francisco
747 Warehouse Street, Los Angeles
Branch Factory: 311 Minna Street, San Francisco

BRISTOL'S

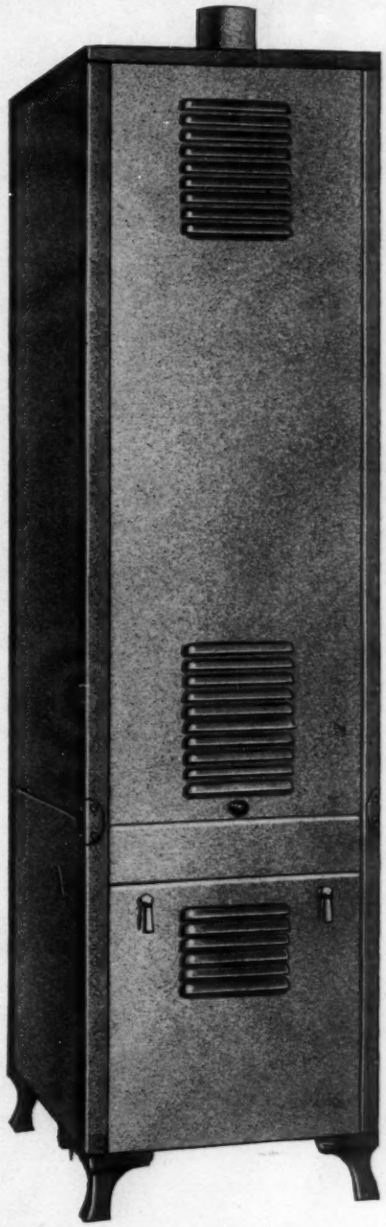
TRADE MARK REG. U. S. PAT. OFF.

WIDE-STRIP PYROMETER

PACIFIC

Forced Air

UNIT FURNACE



Here is the Furnace that is making Gas Heating History—as revolutionary in principle as the automatic refrigerator—as dependably modern as automatic hot water! Brings new luxury to improperly heated homes—new gas heating economy—new standards of home heating comfort and efficiency!

Write for New Literature

PACIFIC GAS RADIATOR CO.

Huntington Park, California, U. S. A.

Oldest and Largest Manufacturer of Gas Heating Appliances in the West

IT TAKES ALL 3 TO MAKE

Controlled Winter Comfort

1. BILT-IN THERMO-CONTROL
2. CRADLE CIRCULATION
3. AUTOMATIC PILOT

and these are exclusive WARD Floor Furnace Features

Your load is as good as the appliance you sell. Sell only superior heating equipment that once installed will stay in for years, increasing your load and your customer satisfaction. In other words . . . Sell WARDS!

WARD

HEATER COMPANY, LTD.
1800 W. Washington Blvd. PArkway 9171
Los Angeles, Calif.

burners, with the result showing that gas cooked faster.

At the end of the 10 weeks campaign 75 sets of the advertisements were turned in to earn an extra $5 allowance on newly purchased appliances.

In addition the series of letters provided a condensed sales manual for the gas company's sales personnel, to be used whenever a competitive situation was encountered.

It is believed that the startling frankness of the letters could not help but reassure Michigan homemakers of the superiority of gas and the modern gas range for cooking, for a natural reaction would be that the gas company would not permit the publication of any such statements were it not absolutely sure of their authenticity.

The letters were prepared by Bernard T. Franck, supervisor of sales of American Light & Traction Co., the parent company of Muskegon Gas Co. Those assisting in their preparation were Miss Claribel J. Adams, home service director, Washtenaw Gas Co., Ann Arbor, Mich.; Miss Mabel Claire Atwood, home service director, Grand Rapids Gas Light Co.; Mrs. Ella Liner Lambert, home service director, Milwaukee Gas Light Co.; Miss Dorothy E. Shank of the American Stove Co.; Watson E. Derwent, vice-president of the George D. Roper Corp. and R. M. Conner, director of the American Gas Association Testing Laboratory.

Los Angeles G. and E. Employees Hold Hobby Show

Employees of the Los Angeles Gas and Electric Corp. conducted a Hobby Show on November 14 and 15, exhibits including airplane flying models, a model steam locomotive capable of pulling 1,000 pounds at 12 miles per hour, a toy railroad, handicrafts such as leather work, wood carving, needle work, painting, radio apparatus, telescopes, model sail boats, etc. Among collections on exhibit were weapons, dance trophies, tropical fish, rare insects, medals, Confederate bonds, newspapers, coins and stamps.

A feature of evening entertainment was a demonstration of a television camera and receiver assembled by Don Hill of the engineering department. Chairman of the employees' educational committee is W. W. King and J. P. McCarthy was in charge of the show.

Detroit City Model Gas Home

Detroit City Gas Co. officially opened a model home to public use on the afternoon of November 7 with a tea attended by Detroit club women. A radio program was broadcast from the living room of the home on the opening day as a feature of the special program planned for the event. The house contains all modern gas appliances.

Replacing Douglas, Ariz., Mains

Arizona Edison Co., headquartering in Phoenix, is reconditioning its distribution mains in Douglas, Ariz. Some 8,000 feet of 2-inch main are being replaced by 6- and 4-inch pipe.

REPRINTS
from back issues of
WESTERN GAS
available at twenty-five cents each

RECENT DEVELOPMENTS IN THE USE OF COPPER PIPE FOR GAS DISTRIBUTION
By F. A. Hough, Distribution Engineer, Southern Counties Gas Co. of Calif., Los Angeles

GAS SERVICE DURING AND AFTER AN EARTHQUAKE
By George H. Finley, Editor, WESTERN GAS

HOW SHOULD THE COMBINATION COMPANY VIEW THE ELECTRIC RANGE?
By Clifford Johnstone, Managing Director, Pacific Coast Gas Assn., San Francisco

CONSTRUCTING THE PANHANDLE-EASTERN PIPE LINE
A THOROUGH-GOING ENGINEERING REVIEW OF THIS 1000-MILE PROJECT
By A. Faison Dixon, of Brokaw, Dixon, Garner & McKee, Geologists and Petroleum Engineers, New York City

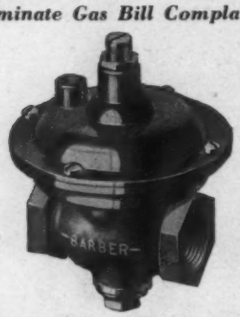
ANALYZING THE MERITS OF SOIL CORROSION SURVEY WORK
By Wm. Thompson Smith, Ford, Bacon & Davis, Inc.

CONVENIENT CHARTS FOR FLOW OF GAS UNDER HIGH PRESSURE
By Frank Wills, Engineer of Production, Pacific Gas and Electric Company

NATURAL GAS AS SPONGE IRON REDUCTANT
By C. G. Maier, Supervising Engineer and Metallurgist, and S. B. Thomas, Associate Physical Chemist, Pacific Experiment Station, U. S. Bureau of Mines

Send remittance with order to
WESTERN GAS
810 South Spring St. Los Angeles, Calif.

BARBER
Gas Pressure
REGULATORS
Eliminate Gas Bill Complaints



Made in ¼", ⅜", ½", ¾" 1", 1¼", 1½" and 2" sizes.

INCREASING numbers of Gas Appliance Manufacturers, Gas Companies, Jobbers and Dealers have switched to Barber Regulators because of their exceedingly low pressure drop, compactness, bronze bodies, and precision of operation. Why not write today for complete literature, prices and discounts on the entire Barber line of Burners and Regulators?

The Barber Gas Burner Co.
3702-4 Superior Avenue
CLEVELAND - - - - - - - - OHIO

MAKE YOUR *Chicago* VISIT A
Real Pleasure

Stay where successful men and women stay—on Michigan Avenue at the Auditorium Hotel where the gallant hospitality of the past meets the modernity of today. Enjoy the fine food,—the large spacious rooms and the convenience of its "edge of the Loop" location.

AUDITORIUM HOTEL
MICHIGAN AVENUE AT CONGRESS STREET
GEO. H. MINK *Manager*

RATES
WITH PRIVATE BATH $2.50
WITHOUT PRIVATE BATH $1.50

G. E. Clifford Appointed Republic District Sales Manager in Los Angeles

GEORGE E. CLIFFORD, formerly assistant manager of sales in the pipe division of Republic Steel Corp., has been appointed district sales manager for Republic in the Los Angeles district, according to N. J. Clarke, vice-president in charge of sales. C. W. West, formerly of the company's Birmingham, Ala., office succeeds to Mr. Clifford's former post.

G. E. Clifford

Mr. Clifford was connected with the sales department of the Atlas Powder Corp. from 1919 to 1925. He then became district representative in Cincinnati for A. M. Byers Co., and two years later was made manager of the central district and later manager of the Pittsburgh district for the same firm. Mr. Clifford joined Republic in 1930. His appointment to the Los Angeles district managership follows the resignation of G. F. Emanuels.

Southern Union Appliance Campaigns Utilize Meter Route Records Maps

IN several towns in New Mexico in the territory of the Southern Union Gas Co. system, maps specially prepared for use in selling gas appliances have met with considerable success. Each map shows all the houses in the given town, those using gas, those piped for gas but not using it and those without gas facilities. Sizes of mains and whether they are low or intermediate pressure are also indicated.

One person keeps the map up to date by referring to the meter route book, indicating active meters with red pins and former locations of meters with blue pins. J. Harvey Wilson, district superintendent at Clovis, of the Gas Co. of New Mexico, is credited with having originated the idea of using such maps as an aid in appliance sales campaigns.

Lone Star Department Heads Will Hold Regular Monthly Luncheon

At a recent meeting of department heads of the Lone Star Gas Co., held in the company auditorium in Dallas, Texas, it was decided to hold regular luncheon meetings of department heads on the first Monday noon of each month. It is planned to include superintendents from outside divisions in these meetings. Luncheons will be served by the Lone Star home economics department.

Peoples Gas Light and Coke Prospects Yield Many Sales

Out of 2,431 space heating prospects turned in by employees of the Peoples Gas Light and Coke Co. during the month of October, 502 resulted in sales during the same month. This figure is an all-time record for the company. The goal of the campaign is 1,000 sales by December.

"MODERNIZE as you repair"

THE SPRAGUE METER COMPANY

BRIDGEPORT, CONN.

Los Angeles, Calif. San Francisco, Calif.

Davenport, Iowa Houston, Texas.

PORCELAIN ENAMEL INSTITUTE, INC.
612 NORTH MICHIGAN AVENUE • CHICAGO

Please send me, absolutely free, a copy of your new, easy-reading, profusely illustrated sales manual on Porcelain Enamel.

Name_____

Firm_____

Address_____

James B. Black New President Pacific Gas and Electric

THE board of directors of the Pacific Gas and Electric Co. elected James B. Black president of the organization at a meeting held on November 20. Mr. Black succeeds the late A. F. Hockenbeamer, who died on November 11.

JAMES B. BLACK

Formerly vice-president and general manager of the Great Western Power Company of California, which was absorbed by the Pacific Gas and Electric Co. in 1930, Mr. Black has been a vice-president of the North American Co. for several years, with offices in New York. The wide financial experience gained here, and his previous operating experience coupled with his intimate knowledge of northern and central California, were among the factors leading to his selection.

Born in Sycamore, Ill., in 1890, Black moved with his parents to California when he was 10 years of age. He was graduated from Lick School in San Francisco in 1908 and from the University of California in 1912 as a mechanical engineer. He went to work at once for the Great Western Power Co. as a service inspector and rose from one position to another, until he became vice-president and general manager in 1922. He continued in this position until 1927.

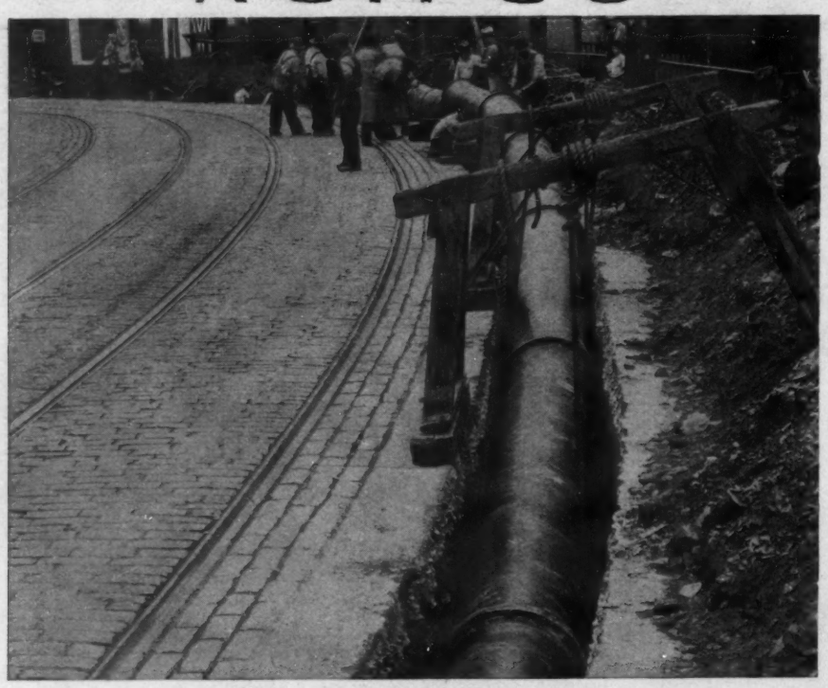
In the meantime the Western Power Corp. of New York, which was the holding company for the Great Western Power Co. of California, had purchased the controlling interest in the San Joaquin Light and Power Corp., serving in the San Joaquin Valley of California. In 1927 the North American Co., purchased the interest of the Western Power Corp. of New York and, needing in their New York offices a man familiar with the western properties, called Mr. Black to New York as a vice-president of the North American organization.

He made frequent trips to California on business connected with the properties here and was the representative of the North American Co. in the negotiations which led to the merger of the Great Western Power Co. and the San Joaquin Light and Power Corp., with Pacific Gas and Electric Co. in 1930, the North American Co. thereby becoming a minority stockholder of the Pacific Gas and Electric Co.

Continuing to hold a vice-presidency with the Great Western Power Co. in the merged operations, Mr. Black was elected to the board of directors of the Pacific Gas and Electric Co. in 1930 and has continued in that capacity since.

Mr. Black will assume his duties at once. No other changes are contemplated among the management officers of the company, according to a statement from C. O. G. Miller, representing the directors.

ACIPCO



Installing large-diameter Mono-Cast Doublex Simplex Centrifugal Pipe in gas distribution system of a large city; note how curve is being easily made. This pipe can be confidently installed in congested urban areas, carrying pressures up to 1000 pounds. For literature address American Cast Iron Pipe Co., Birmingham, Ala.

Mercoid Corp. Announces Combined Pressure and Low Water Control

THE Mercoid Corp. of Chicago has placed a combined pressure and low water control on the market, designated as the Mercoid Type DA-121, providing protection against the hazard of building up excess steam pressure or firing into a dry boiler.

The control is compact in design and of light weight. It is installed facing to the front of the boiler for easy access to the adjustments.

The pressure control utilizes the Bourdon tube principle and has an outside double adjustment feature. No calculations are necessary to determine the operating points with the indicators showing on a plainly visible dial the pressure at which the instrument is set to operate. A device is provided to lock the setting and may be sealed to prevent tampering.

When water gets too low in the boiler, a copper float in the cast iron housing actuates a switch to stop the heating equipment before damage can be done to the boiler. All switches are mercury type, assuring performance in the presence of dust, dirt or corrosive gases.

D. H. Bacon Joins Staff of Ketchum, MacLeod and Grove

D. H. Bacon, for the past five and one-half years advertising manager of Surface Combustion Corp., Toledo, has joined the staff of Ketchum, McLeod and Grove, Inc., advertising agency of Pittsburgh, as account executive. During the past three years Mr. Bacon planned and created all Surface Combustion advertising, which included trade papers, direct mail and newspaper advertising on domestic and industrial equipment.

Ketchum, MacLeod and Grove, Inc., handle advertising for several gas utilities and for the Industrial Division of the American Gas Association.

Community Natural and Texas Cities Complete Water Heater Campaign

Going 143 units over their goal on water heater sales for a two-month period, the Community Natural Gas Co. and the Texas Cities Gas Co. have just completed a campaign which is the most successful ever conducted by the two companies, both of which headquarter in Dallas, Texas. The quota set was 2,500 water heaters, and a total of 2,643 were sold.

Lone Star Laying Line at Palestine

Lone Star Gas Co. is laying a 4-inch pipe line from its 20-inch trunk carrier to serve a salt plant 7 miles west of Palestine, Texas.

SEP 01936

THE MUELLER-GROBLE *Evenflow* REGULATOR

From 10 to 1200 cu. ft. per hour with no drop in pressure • Minimum lock-up pressure • No complicated parts or adjustments • May be sealed to prevent tampering • Made in ¾ in., 1 in. and 1¼ in. sizes.

Furnished with or without seal.

•

Spring or dead weight type.

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For manufactured, natural or liquefied gases.

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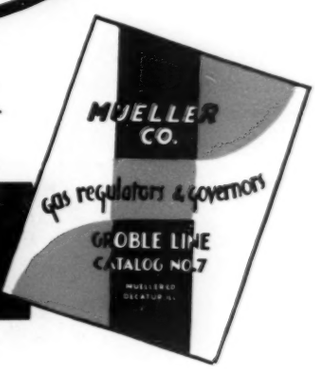

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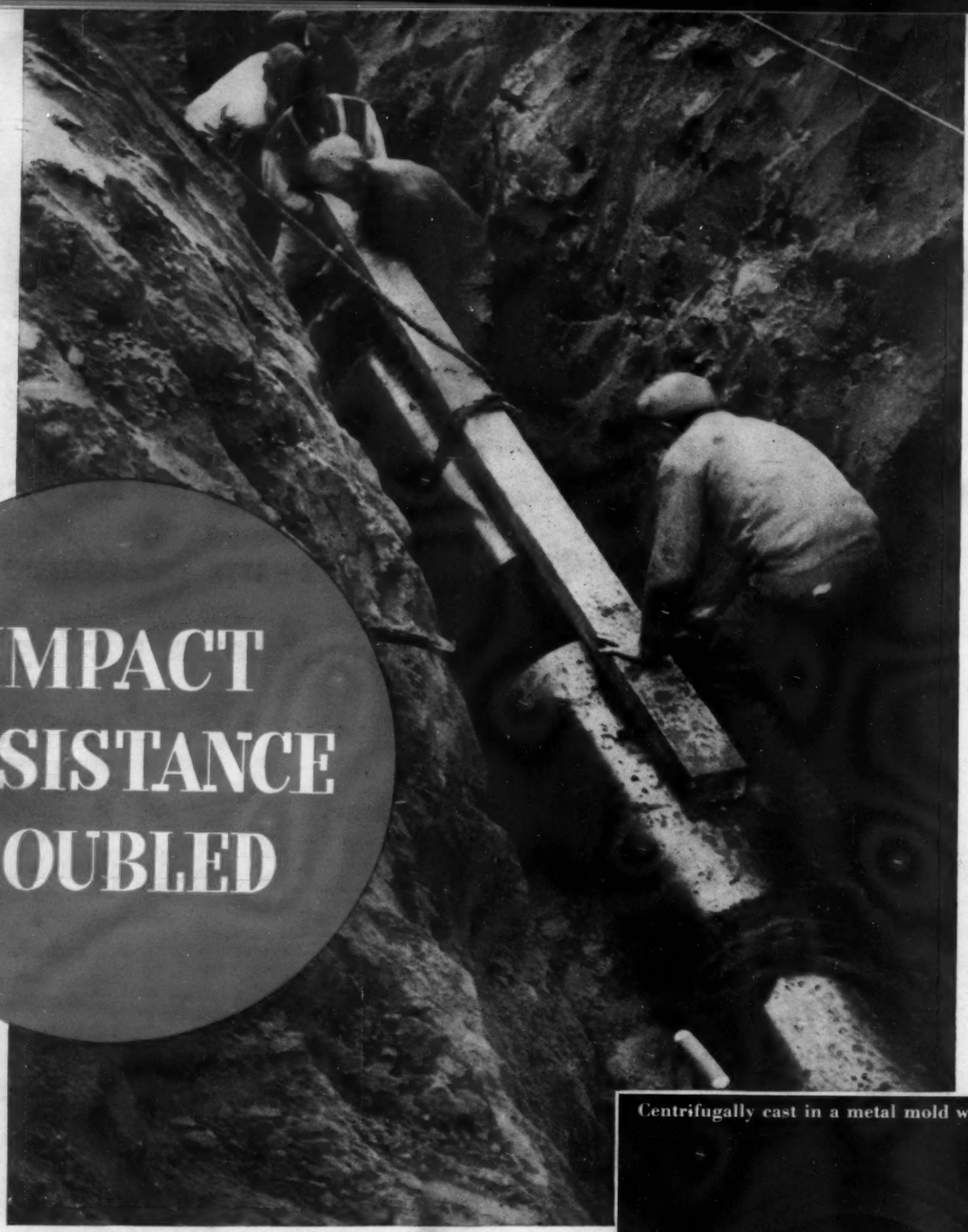

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